Organisatie en Financiering van Musculoskeletale en Neurologische Revalidatie in België

KCE reports 57A

Federaal Kenniscentrum voor de Gezondheidszorg
Centre fédéral d'expertise des soins de santé
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C KIEKENS, K VAN RIE, M LEYS, I CLEEMPUT, M SMET, K KESTELOOT,
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M LONA, M EYSSEN

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Titel:	Organisatie en Financiering van Musculoskeletale en Neurologische Revalidatie in België.
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VOORWOORD

Beleidsmatig typeert men revalidatie vaak als een "complexe" sector. Dat is eigenaardig. Op zich vergt revalidatie een actieve inspanning van patiënt en van zorgverlener en in die zin is het een vrij arbeidsintensieve sector. Anderzijds komen er in vergelijking met andere domeinen van de geneeskunde weinig hoog-technologische interventies of intensieve medische zorgen aan te pas.

"Complexe" sector wijst in dit geval vermoedelijk meer naar een voor beleidsmakers onbegrijpelijke, ondoorzichtige, en in die zin ook moeilijk bestuurbare sector –wellicht is het niet eenvoudig om een overzicht te krijgen van alle mogelijke revalidatie-instellingen, zorgverleners, en activiteiten. De multiple parallelle en overlappende financieringssystemen voor revalidatie zijn daar niet vreemd aan. Meerdere studies in het verleden, waaronder enkele van het KCE, toonden de enorme zorgvariabiliteit en het gebrek aan standaardisatie in behandelingsprotocollen aan. Denk maar aan leren stappen na het plaatsen van een heupprothese: op één plaats gebeurt dat meestal monodisciplinair door één kinesitherapeut, en op een andere plaats systematisch multidisciplinair door intensieve revalidatie. Ernstige ruggenmergletsels komen anderzijds niet steeds in gespecialiseerde behandelequipes terecht.

Of dit onderzoek, in complementariteit met een recent rapport van een ministeriële werkgroep, een aantal zinvolle aanbevelingen kan onderbouwen, kan u zelf lezen in dit rapport. Eén conclusie kunnen we u wel al verklappen: de organisatie van de locomotorische revalidatie actualiseren zal niet lukken met enkele snelle, lukrake ingrepen in de reglementering en zal een werk van langere adem worden, in de revalidatie misschien niet eens zo vreemd.

Tijdens dit onderzoek mochten we in de multiple contacten met externe experts vaststellen dat de revalidatie begonnen is aan een professionaliseringsgolf. Vele zorgverleners die dag na dag enthousiast patiënten terug leren functioneren en waar mogelijk re-integreren, zijn nieuwe wegen aan het inslaan waarbij ze de behaalde resultaten meer en meer ook meten. De hoeveelheid klinische studies die de meest efficiënte revalidatiebehandelingen onderzoeken zijn nationaal en internationaal in stijgende lijn. Alvast een hoopgevende beweging.

Jean Pierre Closon
Adjunct Algemeen Directeur

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EXECUTIVE SUMMARY

DOELSTELLINGEN

Het hoofddoel van deze studie was het bestuderen van de huidige 9.50 en 7.71 Riziv-conventies voor musculoskeletale en neurologische revalidatie, en het formuleren van organisatie- en financieringsopties voor de revalidatiebehandeling van deze aandoeningen.

METHODOLOGIE

Een wetenschappelijke literatuurstudie werd uitgevoerd voor het formuleren van de definitie voor het begrip revalidatie. Een literatuurstudie aangevuld met het raadplegen van grijze literatuur en van nationale en internationale experts, werd gehanteerd voor de epidemiologische gegevens, het opstellen van het operationele concept voor de organisatie en financiering van revalidatie, het bestuderen van bestaande klinische paden binnen revalidatie, en de internationale vergelijkende studie. Belgische gegevens werden verzameld, enerzijds via gegevens van Riziv, FOD Volksgezondheid en mutualiteiten, anderzijds door het consulteren van eerdere Belgische studies over dit onderwerp. Verder werd in een beperkte schriftelijke bevraging bij revalidatieartsen, representatief verspreid, op kwalitatieve wijze gepeild naar variaties in klinische praktijkvoering. Vertrekkende van de internationale vergelijkende studie en de Belgische evaluatie werden organisatie- en financieringsmodellen voor de postacute revalidatie in België ontwikkeld. Gebaseerd op gegevens van 3 centra die bereid waren om gegevens ter beschikking te stellen, werden theoretische kosten en opbrengsten volgens het huidige financieringssysteem berekend voor 5 standaard behandelingsprotocollen die opgesteld waren door een panel van 7 revalidatie-experten. De resultaten werden vervolgens geëxtrapoleerd om schattingen te bekomen voor de volledige populatie.

RESULTATEN

DEFINITIE

Een definitie voor het begrip revalidatie werd geformuleerd binnen het kader van de WHO International Classification of Functioning, Disability and Health (ICF).

Revalidatie werd gedefinieerd als een doelgericht proces dat de mogelijkheid biedt om een optimaal niveau van functioneren en onafhankelijkheid te bereiken en te behouden voor personen met beperkingen in acticiteiten en/of maatschappelijke participatie (persoonlijke of omgevingsfactoren mee in aanmerking genomen); wanneer er een redelijke mogelijkheid is op functionele winst of verbetering van levenskwaliteit. Revalidatie omvat 4 stappen: evalueren, formuleren van doelstellingen, aanbieden van behandeling met bewezen meerwaarde, herevalueren. Revalidatie wordt aangeboden in een multidisciplinaire setting die ingebed is in een netwerk.

ORGANISATIE EN FINANCIERING: EPIDEMIOLOGISCHE GEGEVENS

Epidemiologische gegevens werden verzameld voor 5 diagnostische groepen: CVA, ruggenmergletsel, multiple sclerose (MS), totale heupprothese en amputatie van een onderste lidmaat. Deze diagnoses vertegenwoordigen samen 75% van de populatie in locomotorische en neurologische Sp-bedden; wat goed correspondeert met de gegevens uit een zeer grote internationale studie (USA). Het gevonden cijfermateriaal bevatte nauwelijks gegevens over functionele status, wat nochtans noodzakelijk is voor de bepaling van revalidatienoden. De Belgische incidentie voor totale heupprothese bedraagt 160/100.000/jaar en de prevalentie van MS 90/100.000. MS kent echter een moeilijk voorspelbaar verloop en dito revalidatienoden. De incidentie van ruggenmergletsel in

Europese landen bedraagt 1-3/100.000/jaar. Incidentie van amputatie van het onderste lidmaat wordt in België geschat op 12/100.000/jaar. Ongeveer de helft van de patiënten krijgt een prothese, met een verhouding van 1/1 voor bovenbeen- tegenover onderbeen. Voor CVA is de jaarlijkse incidentie in België 185/100 000, maar functionele noden zijn niet gekend. Ongeveer 15% dient door te stromen naar een postacute revalidatiesetting. Naar schatting 1/3 van de huidige musculoskeletale en neurologische revalidatie in Sp-diensten bestaat uit CVA-patiënten.

BELGISCHE SITUATIE

Algemene situatie

Voor de musculoskeletale en neurologische revalidatie bestaat er in België een ruim aanbod, zowel voor eenvoudige basisrevalidatie als voor sterk gespecialiseerde en/of intensieve revalidatie. Bij het bestuderen van de 9.50 en 7.71 conventies, de focus van deze studie, dienen ook de andere financieringsmechanismen vermeld te worden waaronder de betreffende doelgroepen kunnen voorkomen, voornamelijk de K-nomenclatuur en de Sp-ziekenhuisfinanciering. Deze systemen functioneren parallel, overlappen in belangrijke mate en worden gebruikt voor dezelfde indicaties (gebaseerd op medische diagnose), met uitzondering van 3 behandelingsgroepen die enkel toegankelijk zijn onder K-nomenclatuur. Het financieringsprincipe voor conventies en K-nomenclatuur is sterk vergelijkbaar en fundamenteel terug te voeren op (variaties van) een per-prestatie financiering. De financieringsbasis is in de verschillende systemen vooral op historische basis bepaald eerder dan op karakteristieken van de behandelde patiëntenpopulatie.

Behalve de visitatiecommissies voor de Sp-diensten, is er geen kwaliteitscontrole meer sedert de overheveling in 1991 van het "Fonds voor Sociale Reclassering van de Mindervaliden" naar het Riziv. Dit Fonds maakte een duidelijk onderscheid tussen revalidatie met het oog op reïntegratie, en revalidatie als chronische zorg.

Conventies en K-nomenclatuur

Wat betreft de conventies, is er een ruime spreiding over het Belgisch grondgebied, maar toch valt op dat Luxemburg geen enkel revalidatiecentrum heeft dat onder conventie werkt terwijl het aantal in West-Vlaanderen en Brussel opvallend hoog is. De locomotorische en neurologische Sp-bedden zijn minder talrijk in Oost-Vlaanderen en Namen. De conventie 9.50 wordt voor 80% voor ambulante behandelingen gebruikt, terwijl de conventie 7.71 en de K-nomenclatuur voor 60% voor gehospitaliseerden worden toegepast. Voor de 9.50 conventie valt 64% van de behandelingen onder "verworven parese of hersenletsel met ernstige sekwellen", gevolgd door 27% onder "vervolgbehandeling na bereiken van de maximale therapieduur". Voor K-nomenclatuur is dit 38% onder "prothese van grote of middelgrote gewrichten" gevolgd door 16% "cerebrale letsels".

In 2000 werd 0,38% van het totale Riziv-budget gebruikt voor conventies en K-nomenclatuur, in 2004 bedroeg dit 0,49%. Het grootste gedeelte van het gezamenlijke budget werd tussen 2000-2004 opgeslorpt door de K-nomenclatuur (68%), terwijl er naar 7.71 conventies 18% van het budget ging en naar 9.50 conventies 14%. De groei in deze periode bedroeg 50% voor K-nomenclatuur, 83% voor 7.71 conventies en 45% voor 9.50 conventies. Het aandeel voor de kost van transport bedraagt in die periode11% van het budget conventie 7.71 en 33% van het budget conventie 9.50. Binnen de 7.71 conventies liggen de Riziv-uitgaven merkelijk hoger voor diensten die enkel ambulante zorg aanbieden vergeleken met sommige diensten die tevens hospitalisatie aanbieden. Sedert augustus 2004 is er een vernieuwde K-nomenclatuur in voege, de Riziv-uitgaven stegen sedertdien opvallend door een shift naar K60-prestaties. Sedert augustus 2006 zijn er nieuwe voorwaarden ingesteld voor de 9.50 conventie, die opeenvolgend gebruik van K-nomenclatuur en 9.50 conventie binnen één centrum moeten uitsluiten en de ongelijkheid in vergoeding egaliseren.

Tenslotte is het opmerkelijk dat er nog meerdere combinatiemogelijkheden bestaan van multidisciplinaire therapie (K-nomenclatuur of conventie 9.50) met monodisciplinaire

therapie (vb. logopedie), hetgeen de transparantie bemoeilijkt. Verder worden Sp-bedden gefinancierd op 7/7 dagen basis, wat het doorbrengen van weekends thuis ontmoedigt.

INTERNATIONALE VERGELIJKING

Vijf landen werden geanalyseerd: Nederland, Frankrijk, Duitsland, Zweden en de USA. In alle bestudeerde landen zijn hervormingen gaande in de revalidatiesector, waarbij gestreefd wordt naar een duidelijk revalidatieconcept. Centraal staan telkens de noden van de patiënt, het bestaan van verschillende revalidatiefases en overeenkomstige revalidatieorganisaties, en het voorzien van continuïteit tussen de verschillende fases. Evenwel, bij het uitbouwen van deze principes stuit men op talrijke moeilijkheden, die verschillen naargelang de algemene organisatie van de gezondheidszorg verschilt. Een volledig uitgewerkt concept voor de postacute revalidatiesector dat al deze nieuwe concepten incorporeert is nog nergens volledig in voege; wel zijn een aantal initiatieven in de diverse landen vermeldenswaard.

Het inschatten van patiëntennoden met name de ziekenhuisverblijfsduur met het oog op financiering gebeurt in de USA op basis van een PCS (patiëntenclassificatiesysteem); overigens gebeurt patiëntenselectie op basis van een medische beslissing die in Duitsland (en in Nederland voor de overgang naar de chronische fase) bekrachtigd wordt door de verzekeraar. In Nederland en Duitsland gebeurt een belangrijk deel van de revalidatie in een chronische setting, ondermeer voor de oudere populatie. Eveneens in Duitsland gebeurt veel revalidatie tijdens hospitalisatie; Zweden daarentegen is sterk gericht op revalidatie in de thuissituatie. In Duitsland wordt, enkel voor neurologische revalidatie, de Barthel-Index gebruikt voor transfer van de ene naar de andere fase. Netwerking is ondermeer voor CVA in Nederland reeds goed uitgebouwd via de ketenzorg, en er gebeurt benchmarking tussen de verschillende netwerken.

In alle landen worden verschillende niveaus onderscheiden in de revalidatie: basis – specialistisch - hoogspecialistisch. Ondermeer de behandeling van ruggenmergletsels wordt nagenoeg steeds als hoogspecialistische zorg aanbevolen.

Globale financieringsbudgetten zijn moeilijk vergelijkbaar van land tot land, aangezien een wisselend gedeelte van de terugbetaling geschiedt via private verzekering of geregeld wordt op lokaal eerder dan op nationaal niveau. Algemeen valt de introductie op van marktprincipes met onderhandelingen tussen zorgaanbieders en verzekeraars. O.a. in de USA en Duitsland is dit reeds operationeel in de revalidatiesector.

ORGANISATIE EN FINANCIERING: PATIENTENCLASSIFICATIESYSTEMEN

Algemene beschouwingen

De hoger vermelde theoretische definitie dient in de praktijk gekoppeld te worden aan een patiëntenclassificatiesysteem (PCS). Een PCS laat toe om individuele revalidatienoden te evalueren (“meten”), met het oog op enerzijds adequate klinische behandeling, anderzijds de verwijzing naar de meest geschikte organisatie en conforme financiering. Een PCS dat tegelijkertijd klinische en organisatorische/financiële doeleinden dient, bestaat momenteel niet, evenmin als een meetinstrument dat voor beide doeleinden voldoet.

International Classification of Functioning, Diasability and Health (ICF)

ICF wordt momenteel in de internationale literatuur aanvaard als de meest volledige classificatie van mogelijke gevolgen van gezondheidsproblemen en wordt beschouwd als algemeen denkkader. Er is nog uitgebreid wetenschappelijk onderzoek lopende om de toepassing van ICF voor organisatorische doeleinden mogelijk te maken. Wel werden reeds de ICF items gegroepeerd die van toepassing zijn voor de acute en postacute fase van musculoskeletale en neurologische revalidatie. Er gaat veel aandacht naar het omzetten van bestaande PCS naar ICF.

PCS voor organisatie en financiering

De hoekstenen van een PCS voor organisatorische en financieringsdoeleinden in revalidatie zijn volgens literatuuronderzoek en overleg met internationale experten enerzijds de medische diagnose, anderzijds informatie over de functionele status en mogelijkheden van de patiënt, en tenslotte additionele gegevens als leeftijd, comorbiditeiten en sociale situatie. Een meetinstrument dat functionele status bepaalt in het kader van organisatie en financiering, dient een gevalideerd meetinstrument te zijn dat toepasbaar is voor meerdere diagnostische groepen; in het kader van deze studie zijn dit de musculoskeletale en neurologische aandoeningen. Momenteel voldoen enkel de FIM-schaal en Barthel-Index aan deze voorwaarde, ook al hebben deze schalen meerdere beperkingen (oa. "ceiling effect", voornamelijk informatie over ADL-vaardigheden,...). Wat betreft PCS werden in twee publicaties de bestaande en reeds gebruikte PCS voor revalidatie onderling vergeleken. Beide publicaties weerhouden FIM-FRG en AN-SNAP als de beste systemen. FIM-FRG, ontworpen in de USA, wordt momenteel in meerdere landen gebruikt in subacute ziekenhuisrevalidatie in het kader van een prospectief betalingssysteem. Op basis van medische diagnose, FIM-schaal, leeftijd en comorbiditeiten worden 67 subgroepen onderscheiden, gekenmerkt door een homogene verblijfsduur (ipv. intensiteit van de revalidatiebehandeling gezien de beperkte beschikbare wetenschappelijke evidentie ivm. therapienoden en –intensiteit) en gekoppeld aan een bepaalde financieringsklasse. AN-SNAP is een afgeleide van FIM-FRG, ontworpen in Australië voor gebruik in een land met een kleiner bevolkingsaantal; het laat ook registratie in de ambulante fase toe.

PCS voor organisatie en financiering van postacute revalidatie in België

Hoewel deze systemen hun bruikbaarheid reeds bewezen hebben zouden ze binnen het specifieke kader van het Belgische gezondheidssysteem gevalideerd dienen te worden vooraleer implementatie mogelijk zou zijn. Hiervoor is een representatieve dataset met diagnose, FIM-schaal, leeftijd, comorbiditeiten en sociale situatie van Belgische patiënten nodig, wat momenteel niet beschikbaar is. Als geregistreerde data in België voor gehospitaliseerde (maar niet voor ambulante) patiënten zijn de MKG-MVG beschikbaar. De nieuwere MVG2 vertonen een opvallende overlap met schalen als FIM. Echter, MVG2 is enkel ontworpen voor het registreren van verpleegkundige activiteiten, en het mogelijk gebruik voor registratie van revalidatienoden dient nog aangetoond te worden.

ORGANISATIE EN FINANCIERING: THERAPIESELECTIE, –INTENSITEIT EN DUUR

Organisatie en financiering worden bemoeilijkt door de zeer beperkte klinische wetenschappelijke bewijzen over beste behandeling evenals verantwoorde therapieduur en –intensiteit, hoewel er recent meer studieresultaten beschikbaar komen. Ook de studie van andere landen leverde hierover weinig op. Bij wijze van kwalitatieve illustratie werd bij negen Belgische revalidatieartsen gepeild naar variabiliteit in klinische praktijk. Deze variabiliteit was zeer groot, zowel voor het aantal voorgestelde therapeutische sessies als voor het gehanteerde betalingssysteem en de hieraan verbonden kosten. Een zoektocht naar klinische paden voor revalidatie leverde eveneens slechts een beperkt aantal paden op, veelal gekenmerkt door multidisciplinariteit maar met variabele of helemaal geen informatie aangaande therapie-inhoud, duur en intensiteit.

ORGANISATIE EN FINANCIERING: KWALITEITSCONTROLE

Het bestaan van kwaliteitssystemen werd bestudeerd in vijf andere landen: Nederland, Frankrijk, Duitsland, Zweden en de USA. Vooral Duitsland heeft hier al ervaring mee en implementeerde voor sommige aandoeningen binnen revalidatie kwaliteitsindicatoren gebaseerd op "evidence-based" richtlijnen. Ook in Nederland werden recent een aantal performantie-indicatoren ingevoerd, oa. betreffende therapieresultaten en deelname aan research. Zweden en Frankrijk hebben nog geen operationeel kwaliteitssyteem voor postacute revalidatie. De USA heeft een goed uitgebouwd accrediteringssysteem voor 23 verschillende revalidatieprogramma's (CARF); een Europees accrediteringssysteem zou volgens experts in opbouw zijn.

OPTIES VOOR DE ORGANISATIE VAN POSTACUTE MUSCULOSKELETALE EN NEUROLOGISCHE REVALIDATIE

Als eerste model voor België wordt een «gestratifieerd» model voorgesteld. Dit omvat 3 niveaus (Algemeen, Specifiek en Hoogspecifiek), die onderscheiden worden op basis van complexiteit van de revalidatienoden en doelstellingen, en tevens op incidentie/prevalentie van de betreffende aandoeningen. Eenvoudige revalidatie is revalidatie met doelstellingen op korte termijn; complexe revalidatie is revalidatie met doelstellingen op lange termijn. In het Algemene niveau wordt eenvoudige revalidatie aangeboden, zowel mono- als multidisciplinair. In het Specifieke en Hoogspecifieke niveau wordt complexe multidisciplinaire revalidatie aangeboden; met een hoge respectievelijk lage incidentie/prevalentie. Elk niveau kan zowel op ambulante als op gehospitaliseerde basis aangeboden worden. Via een PCS wordt de patiënt in functie van zijn revalidatie noden en –doelstellingen verwezen naar een bepaald niveau; afhankelijk van zijn evolutie kan hij later doorverwezen worden naar een ander niveau. De diensten uit de verschillende niveaus dienen samenwerkingsverbanden aan te gaan en zo een netwerk te vormen. Verschillende alternatieve opties voor dit eerste model zijn: groepering in de post-acute fase op het Specifieke en Hoogspecifieke niveau volgens pathologie, groepering volgens functiebeperking, groepering volgens pathologie doorlopend vanuit acute over post-acute tot chronische fase, groepering naar doelstelling (volledige maatschappelijke reïntegratie of functionele hertraining in geval van blijvende beperkingen); en tenslotte een model gebaserd op managed care. De Belgische context in acht genomen, lijkt in de postacute fase het «gestratifieerde» revalidatiemodel meest plausibel.

Cruciaal in elk van deze opties is de evaluatie van de patiënt (het PCS), op basis waarvan toewijzing gebeurt aan een specifiek behandelingsniveau. Cruciaal is ook aan wie deze taak toevertrouwd wordt: aan de arts in de acute fase, aan de revalidatiecoördinator in de postacute fase en/of aan een onafhankelijke derde partij (verzekering).

Bij wijze van oefening wordt, ondanks de beperkte wetenschappelijk valide gegevens die als basis hiervoor kunnen dienen, een voorstel gemaakt voor het aan te bevelen aantal revalidatie-organisaties in België. Terwijl Algemene revalidatie breed toegankelijk zou moeten zijn (in acute ziekenhuizen), leiden berekeningen tot maximum 20 à 30 revalidatiecentra op Specifiek niveau. Op Hoogspecifiek niveau zijn een drietal centra voor ruggenmergletsel en MS nodig, evenals enkele Hoogspecifieke centra voor zeer complexe CVA's of andere niet-aangeboren hersenletsels zoals hersentrauma's. Gezien de lage frekwentie van sommige pathologieën, en de veelal dure uitrusting in deze Hoogspecifieke centra, worden best verschillende pathologiegroepen gecombineerd, bijvoorbeeld in 3 à 5 centra.

OPTIES VOOR DE FINANCIERING VAN POSTACUTE MUSCULOSKELETALE EN NEUROLOGISCHE REVALIDATIE

Interpretatie van het ruwe cijfermateriaal uit dit gedeelte van de studie dient met uiterste voorzichtigheid te gebeuren, omwille van methodologische redenen (vb. het inschatten van revalidatienoden door experts, en het schatten van personeelskosten op basis van onvolledige gegevens). Enkel uit relatieve vergelijkingen kunnen conclusies getrokken worden. Het bleek dat de geaggregeerde kosten van ambulante revalidatie en revalidatie in het ziekenhuis niet significant verschillend zijn, maar wel de opbrengsten. Dit kan worden verklaard door het feit dat de huidige financieringssystemen onvoldoende zijn aangepast aan de kostenstructuur van multidisciplinaire revalidatie. Momenteel bestaat er bijvoorbeeld geen specifieke vergoeding voor groepsessies, zodat voor elke patiënt in een groep een individuele verstrekking kan worden aangerekend. De opbrengsten van een groepssessie zijn daardoor artificieel hoog en aangezien er voornamelijk in de protocollen van ambulante revalidatie veel groepsessies voorkomen, verklaart dit het eveneens artificiële verschil tussen opbrengsten voor ambulante- en ziekenhuisrevalidatie.

Tenslotte toonde de analyse dat de budgetten die de afgelopen jaren werden besteed aan multidisciplinaire revalidatie ongeveer overeenkomen met het budget dat men nodig zou hebben indien de standaard behandelingsprotocollen gemiddeld genomen zouden worden gevolgd in de sector en alle revalidatie via conventie 9.50 wordt vergoed. Dit zou kunnen

betekenen dat de huidige revalidatieactiviteiten gemiddeld overeenkomen met de voorgestelde protocollen of dat de protocollen werden gedefinieerd op basis van de huidige praktijk in plaats van op basis van noden.

Wat betreft financiering, wordt voor het Algemene niveau een betaling per prestatie (fee-for-service, FFS) voorgesteld of een gemengd systeem met relatief hoge FFS-component. Voor niveaus met meer homogene patiëntengroepen (Specifiek of Hoogspecifiek niveau, pathologie- of functiespecifiek niveau, pathologiespecifieke centra) wordt een gemengd systeem voorgesteld met een deel forfaitfinanciering en een deel per prestatiefinanciering. Als alternatief kan men op het niveau van Hoogspecifieke centra (met zeer specifieke patiëntengroepen met zeer complexe revalidatienoden) werken met een enveloppe-financiering, i.e. een vaste som per jaar.

Tenslotte wordt een practisch voorstel gedaan over de verschillende implementatiefases van de voorgestelde veranderingen; het ontwikkelen/valideren en implementeren van een registratiesysteem is daarbij het meest urgent. Aanvullend op de medische diagnose komen in aanmerking voor een testfase: MVG2, een functionele schaal zoals FIM of Barthel Index aangevuld met o.a. comorbiditeiten, leeftijd; en de ICF-datasets (zogenaamde "core-"sets) voor musculoskeletale en neurologische revalidatie.

Een vergelijking wordt gemaakt tussen dit rapport en het recent verschenen rapport van de Ministeriële Wergroep Revalidatie onder leiding van Prof. Dr. A. Heilporn (april 2007).

CONCLUSIES EN AANBEVELINGEN

- Er is in België nood aan een coherente visie omtrent actuele verschuivingen in de revalidatiesector. In andere Westerse landen treedt er in revalidatiegeneeskunde een evolutie op naar het centraal stellen van de revalidatienoden van, en het aanbieden van keuzes aan de patiënt; het onderkennen van verschillende revalidatiefases; het streven naar continuïteit tussen de verschillende fases en tenslotte in meerdere landen ook een introductie van marktprincipes met onderhandelingen tussen zorgaanbieders en verzekeraars. België dient zich hierover te bezinnen en een globaal concept op te stellen, zodat van daaruit beslissingen genomen kunnen worden.
- Reeds meerdere studies hebben de problematiek van de musculoskeletale en neurologische conventies in België bestudeerd. De huidige studie hoopt de bestaande informatie samen te vatten en voegt een aantal cruciale elementen toe over de epidemiologie van de behandelde pathologieën, de bestaande situatie in België, de situatie in vijf andere landen, patiëntenclassificatiesystemen, therapieselectie, kwaliteitscontrole en tenslotte organisatie en financiering. Verdere studies lijken slechts zinvol na de nodige beleidsbeslissingen over de toekomstige organisatie van musculoskeletale en neurologische revalidatie in België.
- De volgende aanbevelingen kunnen vanuit de voorliggende studie geformuleerd worden:
- De verschillende financieringssystemen in België voor musculoskeletale en neurologische revalidatie (Conventie 9.50 en 7.71, K-nomenclatuur, Sp-ziekenhuisfinanciering) functioneren parallel en overlappen in belangrijke mate. Er zijn geen argumenten voor het behouden van dergelijke parallele systemen en differentiatie dringt zich op.
- De financiering via deze systemen is eerder op historische basis bepaald dan op karakteristieken van de behandelde patiëntenpopulatie. Er moet gestreefd worden naar transparantie, en dit op basis van geleverde diensten in functie van de noden van de patiënt.
- De Conventies zijn ruim gespreid over België, maar Luxemburg heeft geen enkel revalidatiecentrum onder Conventie terwijl het aantal in West-Vlaanderen en Brussel opvallend hoog is. Indien dit niet op basis van capaciteit per Conventie verklaard kan worden, is correctie aan te bevelen. De provincies Namen en Oost-Vlaanderen

hebben een laag aanbod van S2-S3-bedden voor musculoskeletale en neurologische revalidatie, ook hier is correctie aan te bevelen.

- De mogelijkheid tot combinatie van multidisciplinaire behandeling (K-nomenclatuur of conventie 9.50) met monodisciplinaire nomenclatuur (vb. logopedie) bemoeilijkt ten zeerste de transparantie. Het lijkt logisch deze monodisciplinaire therapie onder toezicht van de behandelende revalidatiearts te integreren in de multidisciplinaire behandeling.
- Sp-bedden zijn gefinancieerd op 7/7 dagen basis. Om binnen de revalidatie het doorbrengen van weekends thuis te stimuleren zou de mogelijkheid kunnen geboden worden van een 5/7 financiering of daghospitalisatie.
- Internationaal wordt aanbevolen de behandeling van ruggenmergletsels zodra de patiënt voldoende stabiel is, toe te vertrouwen aan hooggespecialiseerde centra. Gezien de specificiteit van de problematiek en het beperkte aantal (200 patiënten/jaar in België) zouden ook in ons land een drietal dergelijke centra kunnen opgericht worden.
- Gebaseerd op de bevindingen in de internationale literatuur en de Belgische evaluatie, wordt een «gestratifieerd» model voor de subacute revalidatie voorgesteld, met een Algemeen, een Specifiek en een Hoogspecifiek niveau, georganiseerd in een netwerk. Determinanten zijn complexiteit van de revalidatienoden en incidentie/prevalentie. Alternatieve opties worden eveneens voorgesteld. Cruciaal zijn in elke optie de wijze van selectie bij instroom en doorverwijzing van de patiënt.
- De instroom en doorverwijzing van de patiënten in het systeem dient gebaseerd te zijn op een patiëntenclassificatiesysteem (PCS). Geen enkel bestaand classificatiesysteem of meetinstrument is tegelijk optimaal voor klinische én voor organisatorische/financieringsdoeleinden. Voor deze laatste doeleinden dient een classificatiesysteem de medische diagnose, een meetinstrument dat de functionele noden en mogelijkheden van de patiënt inschat, en een aantal aanvullende gegevens zoals comorbiditeiten, leeftijd en relevante contextuele factoren te omvatten.
- Het huidige registratiesysteem in ziekenhuisgebonden post-acute revalidatie stelt registreren binnen de V 57 categorie verplicht, die informatie omvat over de therapeutische specialiteiten betrokken bij de revalidatie. Wanneer de onderliggende medische diagnoses niet vermeld worden, heeft dit echter geen consekwenties wat betreft terugbetaling. Nochtans gebeurt de huidige financiering op basis van medische diagnose. Het op korte termijn verplicht maken van registratie van de medische diagnose en comorbiditeiten, vb. volgens het ICD-classificatiesysteem zoals voor andere ziekenhuisopnames, zou reeds een zekere vooruitgang kunnen betekenen wat betreft evaluatie van geleverde diensten. Het zou ondermeer betere inschattingen mogelijk maken van incidentie en prevalentie van de respectievelijke terugbetalingscategorieën.
- Momenteel zijn er in België geen gegevens gekend die systematisch informatie verschaffen over de functionele capaciteit van revalidatiepatiënten, wat nochtans onontbeerlijk is naast medische diagnose. Op korte termijn, en in afwachting dat ICF bruikbaar wordt als PCS voor organisatie en financiering, is het opstarten in de postacute fase van systematische registratie van een revalidatieschaal zoals FIM (of Barthel-Index) ten zeerste aanbevolen, zowel in ziekenhuisbehandeling als ambulant. Hoewel deze meetinstrumenten van ADL-activiteiten zeker beperkingen vertonen, zal dit toelaten om reeds een eerste indruk te krijgen van de aard van beperkingen van de behandelde revalidatiepatiënten, hetgeen nu volledig ontbreekt. Ook laat dit vergelijking toe met andere landen die dergelijke schaal gebruiken. Nadien kunnen deze gegevens uitgediept worden tijdens verder onderzoek (zie Research agenda).
- Kwaliteitsevaluatie dient een belangrijk onderdeel uit te maken van elk organisatie- en financieringssysteem. Idealiter wordt hierbij niet alleen rekening gehouden met uitkomst van de behandeling, maar ook met levenskwaliteit, visie van de patiënt op de kwaliteit van zorg etc. Momenteel worden dergelijke parameters niet systematisch gemeten, laat staan geregistreerd. Een degelijk PCS waarbij de hoger voorgestelde

parameters bij instroom evenals bij uitstroom gemeten zouden worden, zou reeds een eerste stap kunnen betekenen in het evalueren van de geboden zorg.

- Zelfs zonder gebruik te maken van een PCS, wordt in enkele andere landen reeds systematisch gebruik gemaakt van kwaliteits- of performantie-indicatoren, oa. wat betreft therapieresultaten (Nederland, Duitsland). Dit zou als voorbeeld kunnen dienen voor België. In de USA bestaat een goed uitgebouwd accrediteringssysteem voor 23 revalidatieprogramma's (CARF); een Europees accrediteringssysteem zou in opbouw zijn. Te noteren valt dat er in België, sedert de overheveling van het "Fonds voor Sociale Reclassering van de Mindervaliden" naar het RIZIV, er geen visitatiecommissies meer zijn in de revalidatie-instellingen, met uitzondering van de visitatiecommissies voor de Sp-diensten. Hervatting lijkt wenselijk.
- Een belangrijk gegeven in de internationale literatuur betreft het streven naar "continuïteit in de zorg", ondermeer door het oprichten van netwerken. Ook in België moeten netwerken georganiseerd worden. In Nederland bijvoorbeeld, is netwerking voor CVA reeds goed uitgebouwd, en er gebeurt benchmarking tussen de verschillende netwerken.
- Hoewel harde wetenschappelijke evidentie hieromtrent ontbreekt, werd bij wijze van oefening het benodigde aantal revalidatiecentra in België ingeschat. De volgende cijfers kunnen in acht genomen worden bij planning van het aantal revalidatiecentra op korte termijn. Maximum 20 à 30 revalidatiecentra zijn nodig op Specifiek niveau. Op Hoogspecifiek niveau is er nood aan 3 à 5 centra, waar de revalidatie van zeer complexe pathologieën gecentraliseerd wordt (oa. ruggenmergletsel, MS, zeer complexe CVAs of andere niet-aangeboren hersenletsels zoals hersentrauma's). Algemene revalidatie dient breed toegankelijk te zijn (via acute ziekenhuizen).
- Wat betreft financiering, wordt voor het Algemene niveau een betaling per prestatie (fee-for-service, FFS) voorgesteld of een gemengd systeem met relatief hoge FFS-component. Voor het Specifiek of Hoogspecifiek niveau wordt een gemengd systeem voorgesteld met een deel forfaitfinanciering en een deel per-prestatiefinanciering. Als alternatief kan men op het niveau van Hoogspecifieke centra werken met een enveloppe-financiering, i.e. een vaste som per jaar.
- Momenteel bestaat geen specifiek tarief voor een revalidatiebehandeling in groep. Het invoeren van een onderscheid tussen individuele revalidatiebehandeling en groepsbehandeling, en een differentiatie qua tarief, lijkt wenselijk.

Research Agenda

Indien beleidsmakers beslissen om een PCS in te voeren, is het aan te bevelen om ter voorbereiding van een implementatie minstens de volgende items te valideren in een representatieve steekproef van Belgische postacute revalidatiesettings: medische diagnose evenals comorbiditeiten en leeftijd, MVG2, FIM of Barthel-Index, ICF-core-sets voor musculoskeletale en neurologische pathologie. Op basis van deze validatie-oefening kan dan beslist worden welke dataset het meest nuttig is met het oog op implementatie van een PCS. Een practisch voorstel omtrent de verschillende implementatiefases wordt beschreven.

Er zijn slechts beperkte wetenschappelijke gegevens beschikbaar over indicaties, inhoud, intensiteit en duur van revalidatietherapie, wat het voeren van een efficiënt en verantwoord therapiebeleid bemoeilijkt. Wetenschappelijke vooruitgang op dit vlak dient nauwgezet opgevolgd te worden, en klinische research in dit domein dient gestimuleerd te worden.

Een ICF gebaseerd PCS-systeem dient verder ontwikkeld te worden, idealiter in een internationale (vb. Europese) context.

De methodologie in deze studie gehanteerd voor de analyse van kosten en opbrengsten, kan verder gebruikt worden om een meer doorgedreven economische analyse van postacute revalidatiecentra uit te voeren. Hiervoor zijn meer precieze cijfers in verband met kosten en opbrengsten van revalidatie op basis van reële noden vereist. Dit vraagt meer gegevens in verband met revalidatiezwaarte en prevalentie van aandoeningen die

multidisciplinaire revalidatie vereisen. Bovendien zijn meer precieze kostengegevens nodig van een groter aantal centra.

Scientific summary

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List of abbreviations

ADL	Activities of Daily Living
AK	Above Knee
ALE	Amputation of a Lower Extremity
AN-SNAP	Australian National Sub-acute and Non-acute Patient classification
AWBZ	Algemene Wet Bijzondere Ziektekosten
AWIPH	Agence Wallonne pour l'Intégration des Personnes Handicapées
BI	Barthel Index
BK	Below Knee
BNMDS	Belgian Nursing Minimum Data Set
CARF	Commission on Accreditation of Rehabilitation Facilities
CEBAM	Belgian Centre for Evidence Based Medicine
CMG	Cost Management Groups
COCOF	Commission communautaire française
CRC	Categorical rehabilitation centre
CVA	Cerebrovascular Accident
DBC	Diagnose Behandel Combinaties
DRG	Diagnostic Related Group
ESS	Environmental Status Scale
FFS	Fee-for-Service
FFT	Fee-for-Time
FIM	Functional Independence Measure
FOD/SPF	Federale Overheidsdienst/Service Public Fédéral
FRG	Functional Related Groups
GP	General Practitioner
ICD	International Classification of Diseases
ICF	International Classiffication of Functioning, Disability and Health
ICIDH	International Classification of Impairment, Disability and Handicap
IFRs-PAI	Inpatient Rehabilitation Facilities – Patient Assessment Instrument
INAMI	Institut National d'Assurance Maladie-Invalidité
KB	Koninklijk Besluit
LRC	Locoregional rehabilitation centre
LEA	Lower Extremity Amputation
LOS	Length of Stay
MC	Marginal cost
MDC	Medical Diagnosis Category
MDS	Minimum Data Set Assessment Instrument
MDS-PAC	Minimal Data Set – Post Acute Care
MFG	Minimale Financiële Gegevens

MKG	Minimale Klinische Gegevens
MPR	Médecine Physique et Réadaptation
MR	Marginal revenu
MS	Multiple Sclerosis
MVG	Minimale Verpleegkundige Gegevens
PAL/NAL	Positief aantal ligdagen/Negatief aantal ligdagen
PCS	Patient Classification System
PM&R	Physical Medicine & Rehabilitation
RAP	Revalidatie Activiteiten Profiel
RCM	Résumé Clinique Minimum
RFM	Résumé Financier Minimum
RIM	Résumé Infirmier Minimum
RIZIV	Rijksinstituut voor Ziekte- en Invaliditeitsverzekering
RUG	Resource Utilisation Groups
SAMPC	Somatisch/ADL/Maatschappelijk/Psychisch/Communicatief
SCI	Spinal Cord Injury
SHI	Statutory Health Insurance
SID	Supplier Induced Demand
SSR	Soins de Suite et de Réadaptation
TBI	Traumatic Brain Injury
THR	Total Hip Replacement
UDSmr	Uniform Data System for medical rehabilitation
US	United States
VAPH	Vlaams Agentschap voor Personen met een Handicap
VFSIPH	Vlaams Fonds voor Sociale Integratie van Personen met een Handicap
WHO	World Health Organisation
ZFW	Ziekenfondswet

Introduction

The primary aim of this project was to study the current RIZIV/INAMI (the National Institute of Sickness and Invalidity Insurance) conventions for "locomotor rehabilitation". In the Belgian context, "convention" refers to an agreement between the RIZIV/INAMI and a rehabilitation organisation concerning financing of rehabilitation services.

As financing and payment is very much related to organisational issues, the secondary aim of the study was to assess the organisation and financing of musculoskeletal and neurological rehabilitation.

Historical developments have lead to an unclear and problematic situation in Belgian musculoskeletal and neurological rehabilitation. Before 1991 the federal "Rijksfonds voor Sociale Reclassering van de Mindervaliden" or "Fonds Maron" regulated and financed all aspects of the rehabilitation facilities. Because of the Belgian political defederalisation this Fund was replaced by four different Regional Funds (VFSIPH, AWIPH, COCOF, Dienststelle der Deutschsprachigen Gemeinschaft für Personen mit einer Behinderung sowie für die besondere soziale Fürsorge). Acute and post-acute rehabilitation remained incorporated in the federal health care regulation (art. 34 of the law concerning compulsory health insurance) and rehabilitation services are since then financed by the RIZIV/INAMI, mainly with a fee for service system.

Rehabilitation activities can be provided within two systems:

- Rehabilitation agreements ("conventions"): different types exist which will be described extensively in chapter 5.
- Nomenclature of Physical Medicine & Rehabilitation (a fee schedule: "K"; art. 22 and 23 "Physiotherapy")

There is a substantial overlap between the different systems and it is not always clear which system to use. Both systems can be applied to hospitalised as well as ambulatory patients.

The hospitalisation of these patients is since the early nineties mostly organised in a day-price system of specialized beds (Sp beds, S2 musculoskeletal and S3 neurological). These beds are accredited by the Ministry of Public Health and the "day-price" also covers some therapists and infrastructure for rehabilitation.

As the organisation and financing of rehabilitation in Belgium is very complex as well as heterogeneous, different studies have been performed the last five years in order to describe the actual situation and make recommendations for a reorganisation of the sector.

- Study by the RIZIV/INAMI (Prof. Heilporn) ordered by Minister F. Vandenbroucke (October 2000).
- Study ordered by the Advisory Board for Rehabilitation and the college of Medical Directors of the RIZIV/INAMI, in the context of the Health dialogues organised by Minister R. Demotte (2003-2004) (Prof. Heilporn).
- Audit of the Rehabilitation sector performed by the budgetary commission of the RIZIV/INAMI (June 2004) (P. Verhavert)
- Study ordered by Minister F. Vandenbroucke: Spécificité des services Sp, Specifieke aspecten van Sp-diensten (2003-2005) (Prof. M-C Closon)
- The study "Réseau de Rééducation et de Réadaptation Locomotrice et Neurologique" by a Ministerial working group (Prof. Heilporn) in 2005-2006, ordered by Minister R. Demotte.

However, these reports contain only limited information based on international scientific literature and data.

For this study two main questions were raised:

- First question: what frame of reference and what criteria should be used for the evaluation of the usefulness, efficacy, efficiency and quality of rehabilitation programmes in terms of structure, process and outcome?

In order to define a frame of reference and criteria, the domain of musculoskeletal and neurological rehabilitation had to be identified, so a conceptual definition of musculoskeletal and neurological rehabilitation was developed.

In the next phase the conceptual definition was made operational. This was done by the development of an outcome model, mainly based on outcome measures and a patient classification system which could ideally be used for resource allocation as well as clinical decision making.

A separate small chapter focused on how workload could be monitored. As the rehabilitation sector in Belgium is currently not using targeted measures, a quick scan was done on how existing registrations (minimum nursing data, FIM, Barthel Index) could be used for profiling the different rehabilitation services.

- Second question: how can the need for rehabilitation services at country level be estimated and what are the financial implications of choices made in the health services organisation model?

A description is made of the current Belgian financing systems for musculoskeletal and neurological rehabilitation: RIZIV/INAMI nomenclature, conventions and also the hospitalisation beds for diagnosis and therapy of musculoskeletal and neurological disorders were taken into account (Sp beds: S2 and S3).

Five pathologies were selected as representative examples for the scope of this study: Stroke, Multiple Sclerosis, Total Hip Replacement, Spinal Cord Injury and Lower Extremity Amputation. For these five selected pathologies, an epidemiologic study was performed. Belgian clinical practice was investigated and compared to clinical pathways developed in several countries.

A separate chapter focused on how other countries have developed experiences in organising and financing post-acute musculoskeletal and neurological rehabilitation. The Netherlands, France, Germany, Sweden and the US were chosen to cover a broad range of health care models.

The following chapters conclude by presenting different conceptual organisation models. Suggestions were made on patient referral and clinical practice. Recommendations were made with regard to a financing system for the proposed organisation model, taking into account aspects of quality control. In addition costs, revenues (for the rehabilitation centres) and RIZIV/INAMI expenditures were calculated in order to simulate the budgetary impact.

Finally, some propositions are made on how to implement the recommendations and a comparison is made with the report of the Ministerial subworkgroup on musculoskeletal and neurological rehabilitation (report 2007 Prof. A.Heilporn).

1 CONCEPTUAL DEFINITION OF MUSCULOSKELETAL AND NEUROLOGICAL REHABILITATION

1.1 DEVELOPMENT OF A CONCEPTUAL DEFINITION OF MUSCULOSKELETAL AND NEUROLOGICAL REHABILITATION

1.1.1 Introduction

In this part of the report, the researcher describes the method to identify the domain of rehabilitation and all of its related aspects, to avoid a too limited view on rehabilitation while answering the questions formulated by the minister of health care. First, the literature search for existing definitions of rehabilitation is described, followed by a proposal for the development of a conceptual definition for musculoskeletal and neurological rehabilitation based on existing literature.

In Belgium the term 'locomotor' is used instead of 'musculoskeletal and neurological'. The researchers will use the term "musculoskeletal and neurological rehabilitation". Besides, musculoskeletal rehabilitation can not be seen disconnected of neurological rehabilitation because many patients have to contend with musculoskeletal and neurological problems at the same time. Within this project musculoskeletal as well as neurological rehabilitation will be discussed.

1.1.2 Critical view on the current published literature

Looking for a definition of rehabilitation in the literature, the researchers ascertained that most of the existing definitions are developed around a specific pathology. No definitions for musculoskeletal and neurological rehabilitation were found. Papers which contain a description of a scientific approach in the development of a definition of rehabilitation are scarce.

A lot of definitions refer to the International Classification of Functioning, Disease and Health (ICF) or components of the ICF. However, ICF is still a theoretical framework. ICF did not yet prove any additional value on relevant data collection about rehabilitation, organisational design for rehabilitation or simulation of the financial impact of rehabilitation.

"ICF is a multidimensional system across which the individual codings are not mutually exclusive and can vary across raters so that "core sets" for different clinical conditions must be agreed upon by users." [1]

1.1.3 Methodology

The objective of the search of the literature was to formulate a definition of musculoskeletal and neurological rehabilitation.

The search of the literature for existing definitions of rehabilitation was preceded by asking some questions. Does a definition for rehabilitation have to be built around a type of patients (pathology, age,…), the different therapies, the concerned professional groups or the goals to achieve? The researchers agreed on a patient centred approach. The definition is built around the outcome and goals because different diagnostic conditions may share the same type of rehabilitation needs. The appropriateness of a therapy is function of the needs and related aims whereas the appropriateness of a specific professional is function of the therapy.

As a result two main questions were formulated before the start of the search:

- How can goals be achieved?

- How are patients assessed and/or selected?

The researchers collaborated with the Belgian Centre for Evidence Based Medicine (CEBAM) to respect the principles of evidence based medicine during their search for definitions. Because the general acknowledged Oxford Centre for Evidence-based Medicine Levels of Evidence speaks only to the validity of evidence concerning prevention, diagnosis, prognosis, therapy, harm, differential diagnosis, symptom prevalence study and economic and decision analyses, the researchers decided to identify a proper hierarchy for evidence related to the objective of the study. By preference guidelines were explored presuming that no guideline concerning rehabilitation practices can be developed without an agreement on a definition of rehabilitation. In the second instance also systematic reviews were included supposing that systematic reviews of published definitions of rehabilitation exist. No meta-analyses were included for the reason that the focus on clinical practice was expected without any statement of general definition. The researchers searched Medline, Embase, PEDro and relevant websites (NHS Guidelines Finder, National Guidelines Clearinghouse, the website of the Disability and Rehabilitation Team of the WHO, the UN website, the website of the New Zealand Guidelines Group). Papers of particular interest were those that analyse and discuss functional outcomes and contained a definition for rehabilitation. CEBAM validated the search methodology as well as the final development of the definition. See for a detailed description of the search algorithms.

Information from the several sources was incorporated into an Excel format intended to maximally facilitate decision-making. Information such as title, author, year of publication, the inclusion of a definition of rehabilitation, the mention of the use of assessment tools, the consideration of a specific pathology or therapy and the identification of outcomes was registered.

Analysing the existing definitions and the opinion of their developers the main point during rehabilitation would be the individual centred approach. The importance of this focus induced an additional search looking for papers concerning the study of individuals' needs and demands related to rehabilitation and the value of these needs as a predictive factor for the outcome of the rehabilitation process. The objective of this additional search was not to make up an exhaustive list of papers reporting individuals' needs and demands but rather to perform a global survey to know if something was published yet.

Because no definitions for musculoskeletal and neurological rehabilitation were found, the project team agreed on the incorporation of the criterion that the musculoskeletal and/or the neurological system must be affected.

1.1.4 Definition of musculoskeletal and neurological rehabilitation

The project team agreed on some conditions related to the content of the definition after consultation of an expert panel. The content of the definition must be clear and meaningful, precise and unambiguous, not related to a specific functional disorder or disease nor coloured by the opinion of a professional group. All different aspects of the rehabilitation process must be covered. The domain of rehabilitation must be bordered to obtain a clear distinction between acute as well as chronic care. For that reason, the definition must contain criteria to select and follow up individuals for rehabilitation, to define rehabilitation services, to identify the type of involved professionals and to organise rehabilitation. To cover these aspects four main question nouns were answered in the definition.

Four main question nouns of the definition:

• **What?**	→ **Individual and Outcome**
• **How?**	→ **Services**
• **Who?**	→ **Professionals**
• **Where?**	→ **Organisation**

DEFINITION

Rehabilitation is a process [2-10] comprising a range of goal-oriented activities [2] providing opportunities [6] to achieve and maintain [11] an optimal level of independence [2, 6, 12, 8, 13 and functioning {, 1997 #107] for individuals with impaired body structures or functions related to the musculoskeletal and/or the neurological system causing activity limitations and/or participation restrictions, considering the relevant contextual factors (personal and environmental) [2, 14] for whom there is a reasonable expectation of functional gain and/or increase in quality of life.

Rehabilitation comprises four core phases [5]:

- Identification of the individual's needs, preferences and capabilities by use of a recognised functional assessment measure [15];
- Collaborative goal setting in partnership with the patient or his/her advocates and the team members, focused on the restoration of function as well as prevention of activity limitations and participation restrictions, including an indicative time frame [15];
- Evidence based activities with proven added value to achieve the predefined goals;
- Assessment of the progress against the agreed goals by means of the functional assessment measure used in step 1) and defining the necessity to reiterate the rehabilitation cycle.

Different types of professionals can be involved in the performance of the rehabilitation process. Professionals must have accredited skills and expertise, appropriate as related to the required interventions in order to achieve the predefined goals.

Rehabilitation services are provided in a specialist rehabilitation organisation [15] accredited as such by a recognised instance. The most appropriate rehabilitation organisation is determined by criteria inherent to the individual's characteristics, the complexity of the individuals' needs and goals, the different professionals involved and the infrastructure and equipment required for the activities. [16] A rehabilitation organisation is part of a network which meets the demand for rehabilitation at all levels of specialisation and in all phases of the process.

1.1.5 Interpretation rules for the definition of musculoskeletal and neurological rehabilitation

For each component of the definition of musculoskeletal and neurological rehabilitation, we shortly explain the keywords.

1.1.5.1 What?

Rehabilitation	Interpretation
…is a process…	Rehabilitation is considered as a process because an 'input' has to be transformed to an 'output'.
…comprising a range of goal-oriented activities…	During this process many different activities can be performed but always related to predefined goals.
…providing opportunities…	The patient has to take the initiatives and has to participate actively to the activities.
…to achieve and maintain…	Rehabilitation stands out from chronic care process because the rehabilitation process ends when goals are achieved. From the moment goals are achieved patients are followed up to control the maintenance of the achieved goals.
…an optimal level…	Optimal is function of an individual's preferences.
…of independence and functioning …	Specially functioning is supported during the rehabilitation process. Independence stands for self reliance.
…for individuals…	Individuals are used instead of patients because rehabilitation covers a wider range then only medical issues such as social, educational, and vocational (cfr. WHO definition for rehabilitation, 1969).
… with impaired body structures or functions …	Impaired body structures or functions indicate that a certain level of dysfunction exists as a result of a health condition (cfr. ICF). This distinguishes rehabilitation from acute care. No diseases or injuries are mentioned for the reason that rehabilitation starts based on a certain level of dysfunction. Different diagnostic conditions may share the same type and amount of rehabilitation needs.
… related to the musculoskeletal and/or the neurological system …	The underlying diagnosis specifies the type of rehabilitation. All ICD-9 codes within the Medical Diagnosis Category (MDC) of disorders and diseases related to the musculoskeletal system, the nervous system and the connective tissues can induce a musculoskeletal and neurological rehabilitation process if the impairment criteria are fulfilled.
… causing activity limitations and participation restrictions, considering the relevant contextual factors (personal and environmental)…	Besides the impaired body structures or functions the other components of the ICF model are also included. ICF is useful to understand and measure health outcomes and is recognised as such by the WHO. No other classification was found that comprised so many outcomes. Participation refers amongst others to social reintegration, an essential goal of any rehabilitation process.
…for whom there is a reasonable expectation of functional gain and/or increase in quality of life.	The possibility to improve the functional level and/or the quality of life must be realistic. A distinction between improvement of functional level and quality of life is relevant. Different measures are used to evaluate both. Rehabilitation can result in a significant progress measuring the quality of life without a significant progress measuring functional level. [17]

1.1.5.2 How?

Rehabilitation	Interpretation
…comprises four core phases…	By describing four core phases a reference to the Rehab-CYCLE [14, 18] is made. The Rehab-Cycle is a structured approach to rehabilitation management that includes all tasks, from problem analysis to the assessment of the effects, thereby involving the patient in clinical decision making. Emphasis is drawn on the patients' perspective (e.g. through patient-rated questionnaires), taking into account the patient's needs and preferences, and discussing therapy goals by means of the ICF Sheet [19].
1) identification of the individual's needs, preferences and capabilities …	The particular differences between individuals' needs and aspirations, the nature of individual professional interactions, and individuals' rehabilitation readiness could diminish the chance of success. Therefore it is advised to take the opinion of the professional as well as the opinion of the concerned individual or his advocates into account.
… by use of a recognised functional assessment measure;	The use of a recognised functional assessment measure makes it possible to assess individuals in a standardised way, to compare them and compose homogeneous groups.
2) collaborative goal setting in partnership with the patient or his/her advocates and the team members, focused on the restoration of function and prevention of activity limitations and participation restrictions, …	There is a desire to meet the patient's expectations and to achieve his or her commitment, but always taking into account practical and evidence-based knowledge of the rehabilitation team (e.g. aspects of secondary and tertiary prevention). Thus, this process of defining the target problems is usually the result of consent between the patient and the health care team.
… including an indicative time frame;	In order to avoid that rehabilitation becomes chronic care, an indicative time frame is desirable.
3) evidence based activities with proven added value to achieve the predefined goals;	Rehabilitation interventions may include measures to provide and/or restore functions, or compensate for the loss or absence of a function or a limitation.
4) Assessment of the process against the agreed goals by means of the functional assessment measure used in step 1) and defining the necessity to reiterate the rehabilitation cycle.	It is important to assess the output of the process in order to measure the efficacy and efficiency of the interventions. The possibility to reiterate the process is essential if goals appear not attained or if the health condition changes and new goals are defined.

1.1.5.3 Who?

Rehabilitation	Interpretation
Different types of professionals can be involved in the performance of the rehabilitation process.	An exhaustive list of professionals is not included in the definition. The involvement of a certain type of professional depends on the required rehabilitation activities as a function of individuals' needs and goals. A multidisciplinary team intervenes in a coordinated interdisciplinary way in case of the presence of goals which require rehabilitation activities belonging to the unique domain of several disciplines. To do this in a coordinated way, a coordinator must be appointed. Because of the need for integration of medical information, such as diagnosis and prognosis, with paramedical, personal and environmental information, this coordinator is a physician specialised in rehabilitation medicine. A rehabilitation process is considered as mono-disciplinary when there are goals requiring rehabilitation activities belonging to the domain of only one type or goals that can be equally performed by several types of disciplines.
Professionals must have accredited skills and expertise, appropriate as related to the required interventions in order to achieve the predefined goals.	The skills and expertise of these professionals must comply with specified quality requirements.

1.1.5.4 Where?

Rehabilitation	Interpretation
… services are provided in a rehabilitation organisation ….	A rehabilitation organisation is a group of persons associated as members in a formally defined framework of interaction. The association is regarded as an entity because members share and interact in order to realise (at least some common) rehabilitation aims. A rehabilitation organisation is generally organised around different rehabilitation (and other) services. In the most practical terms a health care organisation is observable as a rehabilitation facility, a physical entity in which care, treatment or rehabilitation for the sick or the injured are provided by a group of specially trained people.
… accredited as such by a recognised instance.	Outcome of services as well as the rehabilitation organisation must comply with specified quality requirements.
The most appropriate rehabilitation organisation is determined by criteria inherent in the individual's characteristics, …	Individual's characteristics are personal (e.g. the presence of co-morbidities, age, gender) and environmental (e.g. social factors, geographical factors)
… the complexity of the individual's needs and including aims, …	The aspect of different levels of complexity which induces the need for different levels of specialisation, could result in a stratified rehabilitation organisation.

… the different professionals concerned, …	An interdisciplinary coordination in case of a multidisciplinary rehabilitation service includes some specific requirements for a rehabilitation organisation.
… and the infrastructure required for the activities.	Hospital facilities, therapy rooms, meeting-rooms, equipment,…
A rehabilitation organisation is part of a network which meets the demand for rehabilitation on all levels of specialisation and in all phases of the process.	Rehabilitation must be organised along the continuum of care (in the acute, post-acute as well as the chronic phase). Close collaboration between the different facilities is necessary. It might be possible that geographical aspects affect the design of this network.

1.1.6 Discussion

The proposed definition which we will use as a framework during this project, is very comparable to the WHO definition of rehabilitation.

Currently, the WHO defines rehabilitation as: "A progressive, dynamic, goal-oriented and often time-limited process, which enables an individual with an impairment to identify and reach his/her optimal mental, physical, cognitive and/or social functional level. Rehabilitation provides opportunities for the individual, the family and the community to accommodate a limitation or loss of function and aims to facilitate social integration and independence." [6]

Both definitions (Project & WHO) contain a clear reference to the ICF. Although there is only limited experience related to the use of the ICF in practice, there is an agreement on the more global approach on functioning covered by the different components of the ICF model.

We recognise the imperfections of the newly developed definition. A term as 'reasonable expectation' is still too vague. A public discussion is necessary to identify clear criteria to consider reasonability because it concerns the allocation of public resources. We tried to describe 'appropriate' by incorporating a logical relation between individual's needs, goals, interventions, professionals, infrastructure and equipment but this might still be insufficient. Also our attempt to distinct rehabilitation from chronic care by specifying that functional gain and/or increase in quality of life must be expected, can be insufficient.

1.2 CONCLUSIONS

This chapter contains a definition of musculoskeletal and neurological rehabilitation.

A definition of musculoskeletal and neurological rehabilitation is developed based on a systematic search of the published literature. The researchers agreed on a patient centred focus. The definition is built around the outcome and goals of rehabilitation. Four main questions are answered in the definition: what, how, who and where.

The definition of rehabilitation is a critical issue to be resolved in recommending both a patient classification system and options for the organisation model and financing system of rehabilitation. In the next chapter this conceptual definition will be made operational. With the new definition, the researchers recommend implicitly the move from a classification of rehabilitation programmes to a classification of rehabilitation patients. It will be a challenge to select a patient classification system which supports patient referral (clinical decision making) as well as resource allocation.

Key points

- **Policy makers need a global vision on rehabilitation for decision-making concerning organisation (and financing) of musculoskeletal and neurological rehabilitation. Therefore a conceptual framework as well as a definition are essential.**
- **Four main questions have to be answered in the definition: what (individual and outcome), how (services), who (professionals) and where (organisation).**
- **The WHO International Classification of Functioning, Disability and Health (ICF) is worldwide acknowledged as an international framework to describe health and disability. Its applicability will depend on its compatibility with currently used outcome measures and on the improvement of its practicability.**

2 SELECTION OF PATHOLOGIES AND EPIDEMIOLOGY

2.1 SELECTION OF DIAGNOSES

Diagnosis as well as information about level of functioning, personal and environmental criteria are important for clinical decision-making and resource allocation in rehabilitation. [20] [a]

To formulate advice on organisation and financing musculoskeletal and neurological rehabilitation, some diagnoses were selected because of a lack of available information concerning the level of functioning. For these diagnoses epidemiological data were collected, clinical practice patterns were investigated and critical pathways of different countries were analysed and compared.

The selection criteria for the diagnoses were:

- Criterion A: The diagnoses have to induce a musculoskeletal and/or neurological rehabilitation process;
- Criterion B: The diagnoses have to differ mutually concerning characteristics of concerned individuals (e.g. age), progress, impaired body structures and functions causing activity limitations and/or participation restrictions;
- Criterion C: The diagnoses have to be of high incidence and prevalence;

Children were excluded because of the specificity of the approach.

The researchers could have used the Minimal Clinical Data sets (Minimale Klinische Gegevens = MKG; Résumé Clinique Minimum = RCM) which contain the ICD-9 codes per hospital admission in Belgium to determine the medical diagnoses inducing an admission in a rehabilitation unit. Because of time restrictions the researchers looked for existing medical rehabilitation databases which were used to build a classification system.

The Uniform Data System for medical rehabilitation (UDSmr) seems a reliable source of data to select medical diagnoses which meet the selection criteria. In 1988, UDSmr began data collection and reporting services for facilities that provide comprehensive medical rehabilitation services for adults. The UDSmr is used by approximately 60% of the rehabilitation facilities in the United States and by facilities in Australia, Canada, France, Germany, Italy, Japan, Portugal, and Sweden. Currently, this database includes over 13 million patient assessments. The centrepiece of the system is the Functional Independence Measure (FIM), which measures the functional ability of individuals for 18 items across the motor, cognitive, and self-care domains. FIM is the most widely accepted functional assessment measure in use in the rehabilitation community. The UDSmr also contains impairment codes (= diagnoses). The UDSmr was used for the development for the FIM-FRGs.

The FIM-FRGs were developed in 1994 by Margaret Stineman [21] based on 36.980 patient records from 57 freestanding rehabilitation hospitals and 68 units from 35 states in the United States that subscribe to the UDSmr. In the first version only 18 impairment categories were defined. A second version of this model was developed in 1997 [22] which includes two new impairment categories as well as separate groups for patients admitted for evaluation only.

In the FIM-FRG, the patient impairment category, functional status at admission to rehabilitation, and patient age were used to develop groups that were homogeneous with respect to length of stay. In the FIM-FRG the functional status and age are criteria of distinction between different groups.

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[a] http://www.who.int/classifications/icf/en/

The FIM-FRG include probably most of the impairment groups which can induce a rehabilitation process ((+) Criterion A). The FIM-FRG are compounded taking into account impairment group, functional status and patient age ((+) Criterion B).

For the selection of diagnoses some principles were respected, which are represented in Figure 2.1 and Figure 2.2. Only diagnoses within the Medical Diagnostic Categories of disorders and diseases related to the neurological system or the musculoskeletal system and the connective tissues were withheld ((+) Criterion A) (Figure 2.1 = green dots). Within these only the top 5 of well defined diagnoses with a high incidence were kept ((+) Criterion C) (Figure 2.2 and Figure 2.1 = green left-right lines). An exception was made for the two impairment categories of spinal cord which were also retained for the reason that a small group of individuals with very specific rehabilitation needs might require a special approach related to organisation and financing (Figure 2.2 and Figure 2.1 = blue right-left lines). Even though traumatic brain injury (TBI) requires a specific rehabilitation service, traumatic brain injury was not included for the purpose of the study due to overlap concerning patients' profile with spinal cord injury and the clinical characteristics with stroke patients. Moreover, they appear even less frequent than spinal cord injury.

Figure 2.1: Link of the UDSmr Impairment groups to the FIM-FRG Impairement categories (Version 1994) and the Major Diagnostic Groups [23].

Major Diagnostic Categories	FIM-FRG Impairment Categories (Version 1.1)	UDSmr Impairment Group Codes
1. Disease and disorders of the nervous system	1) Stroke	Left body (right brain)
		Right body (left brain)
		Bilateral
		No paresis
		Other stroke
	2) Brain dysfunction, nontraumatic	Other brain
	3) Brain dysfunction, traumatic	Open injury
		Closed injury
	4) Spinal cord injury, nontraumatic	Paraplegia incomplete
		Paraplegia complete
		Quadriplegia incomplete C1-4
		Quadriplegia incomplete C5-8
		Quadriplegia complete C1-4
		Quadriplegia incomplete C5-8
		Other non-traumatic SC
	5) Spinal cord injury, traumatic	Paraplegia incomplete
		Paraplegia complete
		Quadriplegia incomplete C1-4
		Quadriplegia incomplete C5-8
		Quadriplegia complete C1-4
		Quadriplegia incomplete C5-8
		Other traumatic SC
	6) Neurological conditions (otherwise not classified)	Multiple sclerosis
		Parkinsonism
		Polyneuropathy
		Other neurologic
2. Diseases and disorder of the musculoskeletal system and the connective tissues	7) Lower extremity amputation	Single lower extremity above the knee
		Single lower extremity below the knee
		Double lower extremity above the knee
		Double lower extremity above/below the knee
		Double lower extremity below the knee
	8) Other amputation	Single upper extremity above the elbow
		Single upper extremity below the elbow
		Other amputation
	9) Osteoarthritis	Osteoarthritis
	10) Other arthritis	Rheumatoid arthritis
		Other arthritis
	11) Orthopedic: Lower extremity fracture	Status post hip fracture
		Status post femur (Shaft) fracture
		Status post pelvic fracture
		Status post major multiple fracture
	12) Orthopedic: Lower extremity joint replacement	Status post hip replacement
		Status post knee replacement
	13) Other orthopedic	Other orthopedic
3. Diseases and disorders of the respiratory system	14) Pulmonary	Chronic obstructive pulmonary disease
		Other pulmonary
4. Diseases and disorders of the circulatory system	15) Cardiac	Cardiac
5. Major multiple trauma	16) Major multiple trauma	Brain + spine cord
		Brain + multiple fracture/amputation
		Spinal cord + multiple fracture/amputation
		Other multiple trauma
No direct equivalent	17) Pain	Neck pain
		Back pain
		Extremity pain
		Other pain
No direct equivalent	18) Otherwise not classified	Burns
		Spinabifida
		Other congenital
		Other disabling impairments

Figure 2.2: Number of cases per FIM-FRG Impairment category [22].

Characteristics of FIM-FRGs Version 2.0				
Impairment category	N	Number of FRGs	Variables	R^2
Stroke	26183	9	M,C,A	.26
Nontraumatic brain	2513	4	M,A	.24
Traumatic brain	3214	5	M,C	.32
Nontraumatic spinal cord	2609	4	M	.23
Traumatic spinal cord	1831	4	M	.30
Guillain-Barré	388	2	M	.30
Neurological	3558	2	M	.13
Lower extremity fracture	12445	4	M,C	.09
Joint replacement	12658	7	M,C,A	.16
Other orthopedic	3715	2	M	.08
Lower limb amputation	3256	2	M	.07
Other amputation	211	1	-	-
Osteoarthritis	1651	2	M	.12
Rheumatoid arthritis	1469	2	M	.10
Cardiac	1038	2	M	.15
Pulmonary	1075	3	M	.19
Pain	1591	2	M	.02
Major multiple trauma (MMT)	534	2	M	.18
MMT with brain/spine injury	435	3	M,C	.37
Miscellaneous	4163	3	M	.15
Evaluation only	910	2	M	.08
Overall System	85447	67		.32
M = Motor-FIM; C = Cognitive-FIM; A = Age				
Cross-validation R^2				

This selection of diagnoses was discussed with an expert panel. Lower extremity fractures were considered as too variable related to rehabilitation needs and goals. For that reason, they were excluded from the selection. Within the group of neurological conditions only multiple sclerosis was withheld because it affects a rather young population and is characterised by a specific course of recurrent acute episodes. Within the group of lower extremity joint replacements, the total hip replacements were withheld. Finally five diagnoses were selected: stroke, multiple sclerosis, total hip replacement, spinal cord injury and lower extremity amputation. For these diagnoses incidence and prevalence numbers were searched.

To check if the selected diagnoses were representative for Belgium, we analysed the results of the Pathos-Aggir-Socios project coordinated by Prof. Marie-Christine Closon in 2005[24]. During this project a compilation of different measurement tools was tested in a sample of Belgian hospitals and, amongst other aspects, the diagnoses requiring rehabilitation was registered.

It seemed that of all individuals with musculoskeletal and/or neurological lesions admitted on a Sp facility (for a list of all diagnoses causing musculoskeletal and/or neurological lesions see attachment) 75% was diagnosed with one of the five selected diagnoses. Sp facilities are facilities for specialised care and are not bound to respect an average length of stay (in contrast with acute beds). Therefore, individuals with rehabilitation needs are mostly admitted to such a facility and not to an acute care facility. These results are an indication that the chosen diagnoses are fairly representative.

It is interesting to compare the percentages in Figure 2.3 with the percentages per FIM-FRG impairment category as presented in Figure 2.1 and 2.2. In Figure 2.3, on a total of 85 447 patient cases, Stroke accounts for 30.6%; Neurological conditions not otherwise

specified for 4.1%; SCI for 5.2%; Joint replacement (knee and hip) for 14.8% and LEA for 3.8%.

Figure 2.3: Pathos-Aggir-Socios: Diagnoses which underlie rehabilitation needs (Inpatient)

	Of all patients with musculoskeletal and/or neurological lesions, admitted on a Sp service
Stroke	28%
MS	10%
SCI	8%
THR	26%
LEA	3%
Selected diagnoses	75%
Musculoskeletal and neurological lesions	100%

2.2 EPIDEMIOLOGY

2.2.1 Methodology

In the literature search for epidemiologic data, the focus was on incidence, prevalence and mortality. If available, data on the degree of dependence were collected but because of unclear use of validated scales, these data were only mentioned in the attachments. See also the attachments to consult more details.

Initially, the researchers searched the Pubmed database for studies published after January 1, 2000 that might contribute to an up-to-date view on incidence and prevalence data of the selected diagnoses in Belgium, The Netherlands, Germany, France and Great Britain. Pubmed was searched using the MeSH terms "Epidemiology", "Incidence", "Prevalence", "Statistics and numerical data" and "Trends", combined with the diagnoses and the mentioned country names or the MeSH term "Rehabilitation". Reference lists of incidence or prevalence studies were also examined. If for certain diagnoses only few articles were published after January 1, 2000 the search was extended to the period before January 1, 2000 without mentioning country names.

Earlier research for incidence and prevalence data for amputations and spinal cord injuries was done by a team of the Federal Centre of Expertise for the Health Care Sector[25]. The studies selected by this team were included additionally.

Finally, the researchers asked Belgian experts whether they were aware of any relevant papers.

Only papers reporting incidence or prevalence data of the total population of a region were scanned. In other words, papers that only consider individuals presenting a certain pathology or treated with a specific therapy were excluded. However, there is a difference in population selection between the papers. Some papers contain data collected at the level of a facility, other papers contain data collected at the level of a community. The first type of data selection might be less complete because not all individuals reach a facility after for example a traffic accident or a stroke.

The search algorithms and results can be found in the attachments.

2.2.2 Results

28 relevant publications were found for 'Stroke', 11 for 'Total Hip Replacement', 10 for 'Multiple Sclerosis', 10 for 'Lower Extremity Amputation' and 18 for 'Spinal Cord Injuries'.

2.2.2.1 *Stroke*

INCIDENCE

For Belgium, crude incidence data for stroke (first ever AND recurrent) vary from 200 to 230 per 100 000 inhabitants per year [26, 27]. After age adjustment more males (196 per 100 000) than females (163 per 100 000) are affected by stroke (first ever AND recurrent) [28]. Age and gender adjusted incidence for stroke (first ever AND recurrent) is situated around 185 per 100 000 inhabitants per year [29, 30]. In a recent (2006) review using the structure of WHO's stroke component of the WHO InfoBase, studies on stroke epidemiology published in peer-reviewed journals were analysed. It concerned 44 incidence studies and 12 prevalence studies. Data for Belgium are presented in Figure 2.4.[31]

Figure 2.4: Stroke incidence estimates for Belgium [31]

	Belgium	
Age	Men	Women
25–34	19	12
35–44	37	23
45–54	139	84
55–64	312	186
65–74	812	550
75–84	1446	1237
85+	1754	1661

Internationally, crude incidence for stroke (first ever AND recurrent) ranges from 174 to 224 per 100 000 inhabitants per year [32, 33]. Crude incidence for first ever stroke is situated around 280 per 100 000 inhabitants per year [32 , 34, 35], that is a large number compared to the other data obtained and as a consequence to consider with reserves. And, as in Belgium, more males (280 per 100.000) than females (200 per 100 000) were affected [36].

Age adjusted incidence for stroke (first ever AND recurrent) ranges from 101 to 285 per 100 000 inhabitants per year for males and from 47 to 198 per 100 000 inhabitants per year for females [37]. Age adjusted incidence for first ever stroke ranges from 100.4 to 182 per 100 000 inhabitants per year [38, 33, 39-41].

Age and gender adjusted incidence for stroke (first ever AND recurrent) ranges from 220 to 269 per 100 000 [42, 43]. Age and gender adjusted incidence for first ever stroke ranges from 161 to 208 per 100.000 inhabitants per year [33, 42, 35]

PREVALENCE

Belgian data on stroke prevalence were obtained via a recent review using the structure of WHO's stroke component of the WHO InfoBase. Studies on stroke epidemiology published in peer-reviewed journals were analysed. It concerned 44 incidence studies and 12 prevalence studies. See Figure 2.5. [31]

Figure 2.5: Stroke prevalence rates for Belgium [31]

Age	Belgium	
	Men	Women
25–34	114	65
35–44	218	124
45–54	1072	804
55–64	2185	1476
65–74	5052	3568
75–84	7830	6260
85+	9403	8362

Internationally, large differences in prevalence data of stroke appeared. In one publication the prevalence of stroke was estimated at 750 per 100 000 [43]. In another publication the prevalence was estimated about 100 per 100 000 [44] what is probably an underestimation in comparison with the incidence data.

MEAN AGE AND MORTALITY

The mean age at onset for males is 63.3 years, for females 71.4 years [36]. Yearly stroke mortality ranges at 28 days from 15.9% to 33% and at 1 year from 26.3% to 37.3% [45, 33, 41, 35].

2.2.2.2 *Total Hip Replacement*

INCIDENCE

The crude incidence of total hip replacement in Belgium was about 160 per 100 000 inhabitants in 2004 [46].

Internationally, the crude incidence of total hip replacement ranges from 58 to 126 per 100 000 [47, 48].

Age standardized incidence of total hip replacement (primary and revision) ranges from 112 to 113 per 100 000 [49]. Age standardized incidence of primary hip replacement show a higher incidence for females (87.1 per 100 000) then for males (65.5 per 100 000 [50]. The same counts for the hip revisions (females: 21.0 per 100 000; Males: 16.6 per 100 000) [51].

Age and gender standardised incidence of primary hip replacement ranges from 134 to 193 per 100 000, of revisions from 21.1 to 43 per 100 000 [52], [53].

In 2004, 16 599 THR were registered in Belgium [46].

PREVALENCE

An estimation of the prevalence of hip disease severe enough to require surgery was 1520 per 100 000 aged 35-85 [54]

MEAN AGE AND MORTALITY

The mean age of the population undergoing a primary hip replacement is 68.6 years and 71.8 years within the population undergoing a revision [51]

Mortality within 90 days after a total hip replacement is 1100 per 100 000 [47]

2.2.2.3 *Multiple Sclerosis*

INCIDENCE

No Belgian data were found.

Crude incidence of multiple sclerosis ranges from 4.3 to 6.1 per 100 000 [55, 56, 57; 58].

A recent review contains an estimation of the mean multiple sclerosis incidence in Europe of 4 to 4.2 per 100 000. In this review the estimation is based on data from Croatia, Denmark, Finland, France, Greece, Hungary, Iceland, Italy, Malta, Norway, Poland, Spain, Sweden, Ukraine and the U.K. [59, 60]

PREVALENCE

In Belgium there is a prevalence of 87.5 to 87.9 per 100 000 population [61; 62]. More females (101.3 per 100 000) have multiple sclerosis than males (73.8 per 100 000) [62]

Internationally, the prevalence of MS ranges from 87.5 to 149.1 per 100 000 [63, 64, 56, 61, 57; 58]. For females this ranges from 11 to 282 per 100 000. For males this ranges from 10 to 123 per 100 000 [60]. Female/Male ratio: from 1.1 to 3.4 [60]

MEAN AGE AND MORTALITY

The incidence peaks for females in the age interval 25 years – 29 years, for males in the age interval 30 years – 34 years [58].

Mean survival time after onset ranges from 30 to 45 years [60]

2.2.2.4 *Lower Extremity Amputation*

INCIDENCE

In Dutch Limburg, a southern province of the Netherlands, the crude incidence of major lower extremity amputation is 17.1 per 100 000 inhabitants per year [65]. In the north of The Netherlands, the incidence of major lower extremity amputation is about 19 per 100 000 inhabitants [66].

Internationally, the crude incidence of lower extremity amputation ranges from 15.4 to 34 per 100 000 [67, 68, 69, 70; 65]. Only one report speaks about a major amputation rate that ranges from 20 to 50 per 100 000 inhabitants per year [71]. The below-knee/above knee ratio varied from 0.76 to 0.78 [67, 70]. In one report a ratio of 2.5 was mentioned but it is unclear if only major amputations were withheld as below-knee amputations [71]. Crude incidence of the major lower extremity amputations ranges from 8.8 to 11.7 per 100 000 [69, 72]. Belgian RIZIV/INAMI data (see chapter 10) point towards 12 per 100.000.

The incidence of lower extremity amputations was 10 times higher in diabetic subjects compared to non-diabetic subjects [73]. For people with diabetes the crude incidence ranges from 383 to 440 per 100 000 [68, 73]. For people without diabetes the crude incidence is situated around 38 per 100 000 [73].

The age adjusted incidence of all major Lower Extremity Amputations ranges for males from 3.7 to 58.7 per 100 000 and for females from 0.5 to 32.0 per 100 000 [74].

PREVALENCE

No prevalence data were found.

MEAN AGE AND MORTALITY

No data about mean age were found.

Early hospital mortality after major lower extremity amputation is 7.6%, after minor lower extremity amputation 0.8% [72].

2.2.2.5 Spinal Cord Injury

INCIDENCE

In literature, it was not always explained that only spinal cord injuries surviving the acute phase were included. This may influence the incidence data. Additionally, it was not always mentioned whether it concerned traumatic or non-traumatic spinal cord injuries. Looking at Figure 2.2, a difference in incidence of both causes is suspected. Indeed, the traumatic spinal cord injuries represent 67.5%, the non-traumatic 32.5% [75].

A recent (2006) review of the literature published since 1995 on Pubmed was performed. The incidence of spinal cord injury in Europe ranges from 1.04 to 2.97 per 100 000 (based on data of 7 studies). This is the lowest incidence compared to other continents, South-America and Africa being excluded because no studies from these continents were found. [76].

Incidence rates for males are consistently higher for females [77]; [78].

In older publications, the crude incidence of SCIs ranges from 1.21 to 5.78 per 100 000 [79] ;[80, 81, 77] ; [82]; [83]; [78]. The crude incidence of SCIs surviving the acute phase ranges from 1.04 to 4.43 per 100 000 [79]; [77]. The crude incidence of traumatic spinal cord injury : 1.27 per 100 000 population per year [84]. Some caution with the interpretation is needed because it concerns an old publication (1978).

The age adjusted incidence rate is 1.45 per 100 000 per year [85, 86, 83, 87]. The age and gender adjusted incidence rate ranges from 2.71 to 7.1 per 100 000 [85]; [81].

The results concerning mean incidence of SCI in a European survey (experts were contacted in 21 countries), published in the December 2006 Newsletter of ISCOS (International Spinal Cord Society), showed an incidence of 1.75 per 100 000 inhabitants.

PREVALENCE

A recent (2006) review of the literature published since 1995 on Pubmed was performed. The prevalence of SCI ranges from 28 to 68.1 per 100 000. These data are based on the results of only 2 studies: Australia and Finland. [76]

In older publications, the prevalence of SCI ranges from 7.2 to 112 per 100 000 [80, 88, 81, 82]

The prevalence of traumatic SCI ranges from 25 per 100 000 [84].

MEAN AGE AND MORTALITY

Spinal cord injuries appear mostly in the age interval 33 years to 50 years [78, 76]. Limited to traumatic spinal cord injuries, the mean age is situated around 29 years [84, 89].

2.3 CONCLUSION

Diagnoses were identified respecting some well defined criteria. During discussions with an expert panel, stroke, total hip replacement, multiple sclerosis, lower extremity amputation and spinal cord injury were selected to investigate more in detail in the course of this project.

Of the five selected pathologies, stroke has the highest incidence but affects the oldest part of the population (mostly after retirement) and has the highest mortality rate within the first year after the incident. Moreover, stroke has a high recurrence rate. Of the survivors, less then 50% is independent for activities of daily living afterwards. Only one report presents data related to LOS and discharge destination which is too limited to make conclusions.

Total hip replacement also affects a rather large population and concerns mostly older individuals (after retirement). The crude incidence in Belgium is about 160 per 100 000

per year. As will be described in the chapter concerning clinical pathways, loss of level of functioning is limited in time.

Multiple sclerosis is characterised by a low incidence. Because of a long mean survival time, the prevalence in Belgium ranges between 87.5 and 87.9 per 100 000. Individuals are usually affected by the first symptoms at young age (35y-49y). The progress of the disease requires different types and intensity of therapy depending on the stage.

Lower extremity amputation has a low incidence and affects especially diabetics. No data about the median age were reported. Above knee amputations were performed more often than below knee amputations (4/3). Prosthetic fitting is less frequent among patients with above knee amputations.

Spinal cord injury has the lowest incidence compared to the other pathologies in our selection (1-3 per 100 000 per year). The most important cause of spinal cord injury is trauma. Moreover, spinal cord injury is often associated with other lesions. Length of stay is significantly higher after traumatic SCI compared to non-traumatic spinal cord injury. Very young individuals are affected. Earlier research showed that life expectancy is not significantly reduced under the condition that complications are prevented. As a consequence, prevalence numbers up to 112 per 100 000 are mentioned.

Information concerning incidence and prevalence is relevant in the organisation and financing of rehabilitation services.

Key points

- **For the organisation and financing of rehabilitation services, information on specificity and frequency of rehabilitation needs for a certain diagnostic category is necessary. However, this information is scarse in literature. As a consequence, only incidence and prevalence of diagnostic categories was looked for.**
- **Of the five selected pathologies stroke and THR have the highest incidence, MS and lower extremity amputation are less frequent and SCI has the lowest incidence.**
- **Stroke occurs more frequently with increasing age and has a high mortality and recurrence rate. Incidence (about 185/100 000 per year) and prevalence numbers for Belgium are available, but this is not a clear indicator for rehabilitation needs. In Belgium 1/3 of inpatient rehabilitation services are delivered to stroke patients.**
- **THR is a temporary condition; the incidence found for Belgium is about 160 per 100 000 per year.**
- **MS occurs at young age and is usually progressive; its fluctuating nature makes it difficult to predict rehabilitation needs. The prevalence in Belgium is about 90 per 100 000 per year.**
- **SCI occurs at young age. The incidence in European countries is about 1 to 3 per 100 000 per year.**
- **Lower limb amputation has an incidence rate of 12 per 100 000 per year in Belgium; the incidence rate of major limb amputation in Western countries is estimated from 8.8 to 11.7 per 100 000 per year. The below/above knee ratio is about ¾; prosthetic fitting is less frequent in the latter so that roughly the same number of prostheses is provided for below/above knee amputations.**

3 OUTCOME MEASURES, OUTCOME MODELS AND PATIENT CLASSIFICATION SYSTEMS

3.1 INTRODUCTION

This chapter contains a translation of the conceptual definition of musculoskeletal and neurological rehabilitation into practice. The principal goal is to have tools available to support decisions to the four main questions:

• **What?**	→ **Individual and Outcome**
• **How?**	→ **Methods**
• **Who?**	→ **Professionals**
• **Where?**	→ **Organisation and Infrastructure**

Outcome measures are necessary to explore individuals' needs and capabilities and are essential to assign an individual to an appropriate rehabilitation programme (What?). By one outcome measure only a limited set of outcomes is measured. To have an integrated view on the patients' needs, preferences and capabilities a compilation of all possible outcomes into an outcome model such as the International Classification of Functioning, Disability and Health (ICF) is essential.

To structure inflow of individuals (What?) and determine the type and intensity of required interventions (How?), the professionals to be involved (Who?) and the preferred organisation (Where?), a patient classification system is required. Patient classification systems (PCS) should contain groups of individuals, homogeneous related to outcome and required resources. Such a PCS can serve as a patient selection and referral tool, a framework for selection of therapy as well as for a financing system. In existing patient classification systems individuals are homogeneously grouped related to resource consumption (length of stay (LOS)) but they can not serve for patient referral purposes because they lack sufficient information for clinical decision making.

The final outcome of the rehabilitation process is the main quality criterion. Accreditation requirements for professionals and services are necessary in creating the possibility to deliver services of high quality.

This chapter describes internationally used tools or tools that are applied to a large population. Internationally applied tools make it possible to compare the Belgian situation with the situation in other countries by use of common parameters. If relevant, these tools will be proposed for each selected pathology (Spinal Cord Injury, Lower Extremity Amputation, Stroke, Multiple Sclerosis and Total Hip Replacement). Outcome measures can differ for different pathologies. For the purpose of this study though, one PCS for all musculoskeletal and neurological rehabilitation indication is preferable.

3.2 OUTCOME MEASURES

3.2.1 Introduction

Outcome measures inform about individuals' needs, preferences and capabilities at the start and the end of the rehabilitation process. In daily practice, the results of outcome measures are used to orient health care professionals towards an appropriate type and intensity of therapy. Each outcome measure covers a limited set of outcomes. A compilation of several outcome measures is often required to have enough information for a tailored therapy. Some outcome measures serve in a patient classification system as a relative parameter for allocation of resources (e.g.: Functional Independence Measure (FIM), Barthel Index (BI)).

A search on outcome measures was performed on Pubmed with the algorithm "Outcome Assessment (Health Care)"[MeSH] AND "Rehabilitation"[MeSH] published later than 1999 and delivered 4780 results. A search on Google with the keywords "the use of outcome

measures in rehabilitation" delivered a link to the Pro-Esor-study "The use of outcome measures in physical medicine and rehabilitation in Europe" [90]. The aim of the study was to survey the use of outcome measures in rehabilitation within Europe. The survey focused on nine diagnostic groups: hip and knee replacement, low back pain, lower limb amputees, multiple sclerosis, neuromuscular disorders, rheumatoid arthritis, spinal cord lesions, stroke and traumatic brain injury. It identified a relatively small number of dominant outcome assessments for each diagnostic group and some variation in the preference for measures across regions. The five diagnostic groups selected for this project were included although the described methodology can be extended to other pathologies. A comparable study was performed in Australia "Outcome measurement in Australian rehabilitation environment" [91]. For this study the original survey questionnaire of the Pro-Esor study was used. Three of the five diagnostic groups selected for our project were included.

3.2.2 Outcome measures used in rehabilitation

The results of the Pro-Esor Study and the Australian study for the 5 selected pathologies are included (See Appendix to chapter 3). For each pathology the most frequently applied outcome measures are listed based respectively on a survey of 418 rehabilitation centres across Europe and 440 across Australia.

3.2.3 Discussion

An outcome measure supports by preference clinical decision making as well as resource allocation. This outcome measure must be applicable for most diagnostic groups and must be useful to groups of individuals needing comparable resources.

FIM is the only instrument used for outcome measurement in each diagnostic group. Barthel Index is used in nearly each diagnostic group. In literature both outcome measures are considered as competing instruments [92, 93] . Appropriateness and responsiveness of outcome measures such as FIM and BI requires an extensive search of the literature.

FIM and BI are tools measuring level of dependence related to activities of daily living. The results of this measurement can be used to estimate workload. But neither FIM nor Barthel Index measure rehabilitation needs. Nevertheless, they are currently used to classify patients into homogeneous groups related to resource consumption during rehabilitation (LOS).

3.3 OUTCOME MODELS

3.3.1 International Classification of Functioning, Disability and Health (ICF)

For this project, the concept of an outcome model is used. Several interpretations of this term exist. Within the framework of this project an 'outcome model' is considered as a structured compilation of all possible outcomes as a consequence of a health condition.

An outcome model is required to identify individuals with different types of disabilities or to examine the effect of interventions. One common classification system for clinical decision making as well as resource allocation could not be found in literature. The reason might be that clinical relevant outcomes can differ from one health condition to another and thus give rise to many subgroups. Within a payment model, subgroups need to be limited, otherwise the model becomes impractical .

ICF is an 'outcome model'. The project team as well as the expert panel agreed on the use of this model because it is a member of the WHO Family of international classifications and it is internationally considered as the most complete set of possible outcomes as a consequence of a health condition. The WHO worked previously with the International Classification of Impairments, disabilities and handicaps (ICIDH) [b] (= the model preceding ICF), a model proposed by Saad Nagi from the Institute of Medicine and the National Advisory Board on Medical Rehabilitation Research model [94 95].

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b http://www.cdc.gov/nchs/about/otheract/icd9/icfhome.htm

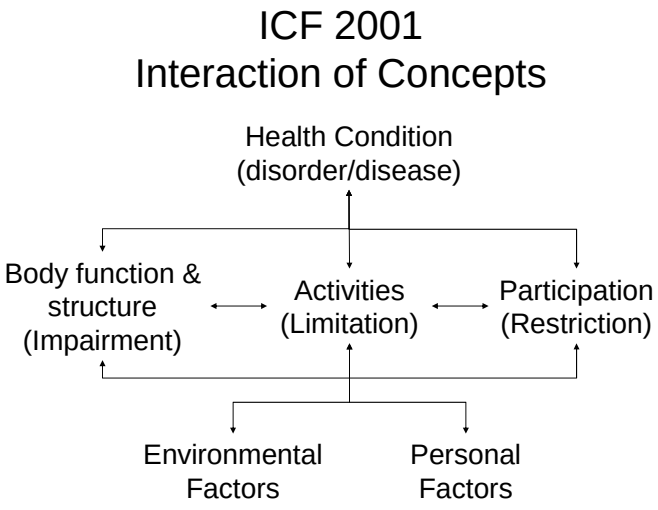
For information on the ICF, the website of the WHO [c], the website of the International Classification of Functioning, disability and health [d], and the website of ICF Research Branch, WHO FIC Collaborating Center (DIMDI), Institute for Health and Rehabilitation Sciences, Ludwig-Maximilian University in Munich [e], were consulted. Publications of Prof. Gerold Stucki, MD, MS, director of the ICF Research Branch of the WHO, were searched on Pubmed. Opinions about the use of the ICF were collected by expert contacts. Expert selection was based on references mentioned in publications or on references of contacted experts.

The International Classification of Functioning, Disability and Health is the result of the revision of the ICIDH. ICF is endorsed by the World Health Assembly as a member of the WHO Family of International Classifications in 2001. It is the generally accepted framework to describe functioning in rehabilitation.

The joint use of ICF and the International Classification of Diseases ICD-10, needs to be addressed when applying the ICF to rehabilitation medicine. WHO considers the ICF and the ICD-10 to be distinct but complementary classifications.

ICF is structured around the following broad components (Figure 3.1):

Figure 3.1: ICF model



Functioning and disability are viewed as a complex interaction between the health condition of the individual and the contextual factors (environmental an personal). The picture produced by this combination of factors and dimensions is of "the person in his or her world". Within ICF these dimensions are considered as interactive and dynamic rather than linear or static. It allows an assessment of the degree of disability, although it is not a measurement instrument. It rather defines "what to measure". ICF can contribute to the integration of the results of different outcome measures.

ICF must be compatible with these measures. Items of assessment instruments used in rehabilitation should be linked to ICF domains. ICF linking rules [96] are being developed to link technical and clinical measures, health-status measures and interventions to ICF. It will be essential to know how scores from a specific assessment instrument can be mapped to the scores used in the ICF. ICF scores represent 'performance' in real life or 'capacity' (with or without assistance), typically in a rehabilitation test situation. However, the most widely used instruments in acute and sub-acute rehabilitation, including FIM, measure

c http://www.who.int/classifications/icf/en/
d http://www3.who.int/icf/icftemplate.cfm
e http://www.icf-research-branch.org/aboutus/history.htm

assistance. It will be a challenge to link the grading of assistance related to performance and capacity.

Core sets per pathology will improve applicability because ICF covers hundreds of different outcomes. It is not possible to score every individual related to all outcomes. Condition specific core-sets can be defined as a selection of ICF domains including the least number of domains but as many as required to be sufficiently comprehensive to cover the prototypical spectrum of limitations in functioning and health encountered in a specific condition. Scientifically based condition-specific core-sets are currently being developed in a collaborative project of the University of Munich with the Classification, Assessment, Surveys and Terminology Group (CAS) of WHO [14, 18]. Core-sets are yet validated for several health conditions such as rheumatoid arthritis, osteoarthritis, stroke, chronic pain and osteoporosis.

ICF success depends on its compatibility with measures used in rehabilitation and on the improvement of its applicability. It is expected to see the development of ICF, based on versions of currently used measurements, and on the development of ICF core sets.[14, 18]

By several experts, it has been claimed that ICF may also be used for the development of prospective payment systems. While current systems such as the FRGs are based on the FIM, future concepts may prefer to base their predictive models on more comprehensive and condition or context-oriented ICF-based sets of domains (See attachments).

3.3.2 Conclusion

ICF can be used as a conceptual framework although the operational application of ICF is still experimental. In terms of clinical utility and long-term consistency of ICF, it makes sense to select relevant parameters from ICF respecting the requirements for developing a scientific classification, then to examine the coverage of these parameters provided in existing instruments. Once the clinical records are back-coded, resource use can be linked to the resulting ICF profiles.

3.4 'ASSESSMENT' INSTRUMENTS

Several outcome measures, patient classification systems and an outcome model are discribed in this chapter. Besides these, two 'assessment' instruments were identified. 'Assessment' instruments are outcome measures which include a classification of individuals. One is the Minimal Data Set for Post-Acute Care, detected during the search for patient classification systems as discussed in the next chapter. The other instrument is "Pathos-Aggir-Socios"[24], developed durring a previous study ordered by the Belgian government. These instruments, combine information on outcome with information on clinical status, treatment, management and resource consumption.

3.4.1 Minimal Data Set - Post Acute Care (MDS-PAC)

The first instrument is the Minimum Data Set – Post Acute Care (MDS-PAC) [97]. In 1999-2000, the Centres for Medicare and Medicaid Services (CMS), formerly the Health Care Financing Administration, developed the MDS-PAC, an original and very detailed assessment instrument for all post-acute care settings. The MDS-PAC is not (yet) used in practice.

MDS-PAC is a comprehensive data collection tool, with over 400 items, including socio-demographic information, pre-admission history, advance directives, cognitive and communication patterns, mood and behaviour patterns, functional status, bladder/bowel management, diagnoses, medical complexities, pain status, oral/nutritional status, procedures/services, functional prognosis, and resources for discharge.

It has been assessed extensively and includes a functional status assessment as informative as FIM, because it uses similar items, and it shows similar validity and inter-observer reliability. In addition, MDS-PAC provides information on treatment, management, and clinical status. However, the implementation of MDS-PAC, both as an assessment and a reimbursement tool, was halted in 2002 and CMS instead proposed the Inpatient Rehabilitation Facilities – Patient Assessment Instrument (IRFs-PAI), which includes FIM as

a measure of patient functional status and is a variation on the FIM-FRG. Implementation of the instrument was halted because it consists of over 400 data elements, many of which simply did not apply to the care and management of many patients [98].

With MDS-PAC it seemed possible to estimate actual rehabilitation costs and define reliable regression models to predict costs based on individual patient characteristics. An Italian team defined comprehensive measures of clinical status and detailed measures of resource consumption by use of MDS-PAC but they concluded that a direct comparison with the long-established FIM-FRGs is needed [97].

3.4.2 Pathos-Aggir-Socios

Pathos-Aggir-Socios was adapted in Belgium by Prof. M.-C. Closon and Dr. L. Habimana (Centre Interdisciplinaire en Economie de la Santé, UCL). It combines three instruments originally applied in geriatric settings: Pathos, Socios, Aggir. [f]

Pathos-Aggir-Socios estimates the workload related to the care for the rehabilitation population. It maps the population of different rehabilitation facilities, based on the perception of the health providers. It can not be used for the planning of a rehabilitation programme at the level of an individual or for an estimation of required resources ex ante.

No studies report on the Pathos-Aggir-Socios used in a rehabilitation setting or in comparison to other outcome measures but it might be interesting to look at the data gathered during this Belgian project. Currently, this instrument is being studied in Switserland.

3.4.3 Conclusion

Both mentioned assessment instruments, MDS-PAC and Pathos-Aggir-Socios, have important disadvantages to be used as tools to support clinical decision-making and resource allocation. MDS-PAC concerns a too extensive set of items to score (+/- 400). Pathos-Aggir-Socios makes it possible to estimate workload related to rehabilitation services but does not contain criteria to predict required financial resources.

3.5 PATIENT CLASSIFICATION SYSTEMS

Patient selection and referral is by preference done with a Patient Classification System (PCS) including all predictive criteria for outcome and resource utilisation.

Publications related to the use of a PCS were searched. Patient Classification System is not included in the MeSH taxonomy. Instead, the keyword 'triage' was used, that is defined as the sorting out and classification of patients or casualties to determine priority of need and proper place of treatment. "Triage"[MeSH] AND "Rehabilitation"[MeSH] resulted in 30 publications. None of them were considered as relevant.

Searching Google with the keywords Patient Classification System and rehabilitation, resulted in publications of MG Stineman about case-mix of patients for rehabilitation and of K Eagar about the comparison of existing Patient Classification Systems and the development of a new PCS [15]. The consultation of another study including a comparison of Patient Classification Systems [99] was found based on a search in the grey literature (Google). During expert contact it seemed that investigations are being performed in the U.S. to develop a Uniform Patient Assessment for Post-Acute Care [100]. For all mentioned PCS Pubmed was searched using the name of the PCS to find reports describing the principles of these systems.

3.5.1 Inpatient or Outpatient Rehabilitation?

Some classifications have been developed specifically for rehabilitation medicine, while others have a broader perspective and contain rehabilitation as only one branch or one class. Often a distinction is made between inpatient and outpatient classification systems [15]; [99]; [1]; [22]. As a consequence, it is necessary to decide if an individual is a candidate for

[f] http://www.belspo.be/belspo/home/publ/pub_ostc/agora/ragff083ann_fr.pdf

inpatient or outpatient rehabilitation before classifying this individual. Criteria for inpatient rehabilitation have also an organisational impact.

Pubmed was searched by (Inpatients (MeSH) AND Patient selection (MeSH) AND Rehabilitation (MeSH)) (N=2), by (Inpatients (MeSH) AND Criteria (All Fields) AND Rehabilitation (MeSH)) (N=47), by (Medical Rehab (Free text) AND Criteria (Free Text) AND (Admission OR Hospitalisation)) (N=4), by (Rehabilitation (Free text) AND Criteria AND (Admission OR Hospitalisation)) (N=1765), by ("Rehabilitation"[MeSH] AND "standards"[Subheading] AND "Patient Admission"[MeSH] (N=45). No relevant papers were detected.

The absence of scientific papers about inpatient rehabilitation criteria suggests a large variability in the selection and use of these criteria. This presumption is confirmed for stroke rehabilitation in a recent European project [101]. This study showed significant differences in case-mix at intake in four European stroke rehabilitation units.

By lack of scientific papers reporting inpatient rehabilitation admission criteria, the researchers explored Google using the keywords "Inpatient rehabilitation admission criteria". Only the first ten results were withheld as no additional information seemed to be found by scanning more results. Comparing countries, no remarkable differences in admission criteria were detected.

A synthesis of all inpatient rehabilitation admission criteria (See attachment) is made:

- Have inability or decreased ability in at least two areas diagnosed by a physician and listed below:
  - complete activities of daily living;
  - move self from place to place;
  - manage elimination needs;
  - communicate or understand information;
  - cognitively process information, memory, and reasoning;
- Be medically stable;
- Need for continued close medical supervision by a physician with specialized training or experience in rehabilitation. The intensity may not be as great as acute care but 24 hour availability of a physician with special training or experience in the field of rehabilitation is required;
- Need for twenty-four hour rehabilitation nursing;
- Need for an intensive programme with multiple services (physical therapy, occupational therapy, speech pathology);
- Be capable of participating cognitively and behaviourally in a programme;
- Be able to physically tolerate programme activity including three hours of therapy per day;
- Have a discharge plan.

Via Google a report of the GTA Rehab Network about 'Inpatient Rehab Referral Guidelines' was also found. The GTA Rehab Network is made up of publicly-funded hospital and community-based organisations from across the Greater Toronto Area (GTA) that are involved in the planning and provision of rehabilitation services. This report contains a quick reference guide for inpatient rehabilitation referrals. The development of the Inpatient Rehab Referral Guidelines has resulted in the standardization of best practice for the inpatient rehabilitation referral process to improve patient flow through the system.

All admission criteria were formulated for rehabilitation patients in general and no specific criteria for musculoskeletal and/or neurological rehabilitation patients were found. However, in a few papers the need for more specific criteria was discussed, specially concerning orthopaedic patients.

In a report of the Centres for Medicare and Medicaid Services (CMS) the application of the 75 percent rule was discussed. To develop the list in the 75 percent rule in 1983,

Centres for Medicare and Medicaid Services (CMS) relied on information from the American Academy of Physical Medicine and Rehabilitation, the American Congress of Rehabilitation Medicine, the National Association of Rehabilitation Facilities, and the American Hospital Association (See also attachment). A control of the admissions in Inpatient Rehabilitation Facilities in 2003 showed that fewer than half of all Inpatient Rehabilitation Facilities Medicare patients in the fiscal year 2003 were admitted for conditions on the list in the 75 percent rule. Nearly half of the patients admitted for conditions not on the list were admitted for orthopaedic conditions. Experts, including those of the Institute of Medicine, generally agreed that condition alone is insufficient for identifying appropriate types of patients for inpatient rehabilitation, since within any condition only a subgroup of patients require the level of services of an Inpatient Rehabilitation Facility, and contended that functional status should also be considered. Further, the experts agreed on the fact that two basic requirements must be met if inpatient hospital stays for rehabilitation services are to be covered: (1) the services must be reasonable and necessary, and (2) it must be reasonable and necessary to furnish the care on an inpatient hospital basis, rather than in a less intensive facility, such as a Skilled Nursing Facility (SNF), or on an outpatient basis." [20]

All these conditions are subject for a discussion with experts. An agreement on more specific criteria must be formulated. For example if 'being medically stable' is one of the conditions than 'medically stable' must be judged using objective indicators.

3.5.2 Inpatient classifications

3.5.2.1 Functional Independence Measure - Functional Related Groups (FIM-FRG) [15, 98]

Origin: Patients were classified into FRGs (Functional Related Groups) following their development in 1993 by Harada [102]. These were refined twice by M Stineman: first in 1994 with the Functional Independence Measure Functional Related Groups (FIM-FRG) [21] and further in 1997 [22]. In the U.S. the FIM-FRGs are known as Cost Management Groups (CMGs).

Outcome measure: Classes are formed based on the Rehabilitation Impairment Code, the motor and cognitive subscales of the FIM at admission and patient age. This data are collected by the Centres for Medicare and Medicaid by use of the Inpatient Rehabilitation Facility – Patient Assessment Instrument (IRF-PAI).

Implementation: By the Centres for Medicare and Medicaid (CMS) Cost Management Groups (CMGs) are compounded for Prospective Payment by use of the Inpatient Rehabilitation Facility – Patient Assessment Instrument (IRF-PAI). This is also in Canada the current national standard.

3.5.2.2 Resource Utilisation Groups (RUG-III) [103]

Origin: The RUG-III model was developed for nursing home patients and groups these patients into one of eight hierarchies on the basis of patient conditions and services required. The RUG-III classification system has eight major classification groups: 1) Rehabilitation Plus Extensive Services, 2) Rehabilitation, 3) Extensive Services, 4) Special Care, 5) Clinically Complex, 6) Impaired Cognition, 7) Behaviour Problems, 8) Reduced Physical Function. The eight groups are further divided into 44 RUG-III-groups by the intensity of the resident's activities of daily living (ADL) needs, and in the Clinically Complex category, by the presence of depression.

Outcome measures: Minimum Data Set Assessment Instrument (MDS).

Implementation: Prospective payment to nursing homes within CMS.

3.5.2.3 Australian National Sub-acute and Non-acute Patient classification [15, 104]

Origin: In 1995 the Centre for Health Service Development at the University of Wollongong was commissioned by the Commonwealth to develop a national classification of sub-acute and non-acute care, including rehabilitation. The resultant classification – the Australian National Sub-Acute and Non-Acute Patient (AN-SNAP) classification - was

released in 1997. The AN-SNAP system, based on analysis of over 30 000 episodes of care, defines four case types of subacute care (palliative care, rehabilitation, psychogeriatric care, and geriatric evaluation and management) and one case type of non-acute care (maintenance care), and classifies both overnight and ambulatory care.

Outcome measure: Concerning rehabilitation the classification is built on impairment groupings, functional status as measured by FIM (Functional Independence Measure) or by Barthel Index as an alternative, and age.

Implementation: The AN-SNAP classification is implemented in NSW, South Australia, Queensland and the Northern Territory for a mixed payment model (an episode component and a per diem component). Victoria and Western Australia are taking different approaches whilst no classifications are in use in Tasmania or the ACT. (1999)

3.5.2.4 Casemix Rehabilitation and Funding Tree(CRAFT) [15]

Origin: July 1999, Victorian Department of Human Services implemented CRAFT (Case-mix Rehabilitation and Funding Tree).

Outcome measure: This model groups patients based on impairment category and according to their functional status as measured by the Barthel Index.

Implementation: This model classifies patient episodes of care in designated rehabilitation units and is being progressively introduced for funding purposes. The Victorian Rehabilitation Classification and Funding System (VicRehab) funding model (Victoria, Australia) is based on the Case-mix Rehabilitation and Funding Tree (CRAFT) classification.

3.5.2.5 Diagnostic Related Groups (DRG) [105]

Origin: The system was created by Robert Barclay Fetter and John Devereaux Thompson at Yale University [106, 107] with the material support of the former Health Care Financing Administration (HCFA), now called the Centres for Medicare and Medicaid Services (CMS), a federal agency with the United States Department of Health and Human Services.

Outcome measure: DRGs are assigned by a "grouper" programme based on ICD diagnoses, procedures, age, sex, and the presence of complications or comorbidities.

Implementation: Many variations of the DRGs exist. All of them are used for Prospective Payment (Medicare, Belgian Hospital Financing System).

In 1983, DRGs were implemented in all acute care, non-specialty hospitals throughout the United States. They were implemented to contain the costs for the Medicare Programme. Instead of hospital reimbursement being based on retrospective charges (after the delivery of care), the reimbursement system changed to a DRG fixed payment or "prospective payment" system, meaning hospitals are compensated for a patient's care based on the qualifying DRG.

3.5.2.6 Diagnose Behandel Combinaties (DBC)

(See also study of rehabilitation in The Netherlands in chapter 8)

Origin: The DBCs are developed in the Netherlands as a variation and 'enrichment' of the DRGs.

Outcome measure: The DBCs group all activities and interventions in a hospital performed by a medical specialist on demand of a patient with a certain diagnosis. All steps in the patient's care process are mentioned.

Implementation: Currently DBCs are used in acute hospital care. From January 1st 2007, DBCs will be gradually introduced for the funding of rehabilitation settings.

3.5.2.7 Programme de Médicalisation du Système d'Information – Soins de Suite et de Réadaptation [99]

Origin: PMSI-SSI has been developed in France in 1998. It not only includes post-acute rehabilitation, but also geriatric care, palliative care, alcoholabuse, and rehabilitation for children. Psychiatric care and long-term ("chronic") care are excluded. It is based on medical diagnosis combined with an assessment of functional impairment and a description of resource utilisation (time attributed to physiotherapy, speech therapy…). Evaluation of the patient has to be completed once every week (instead of once per care episode). The system has been criticised on three points: the large inclusion criteria which weakens its ability to predict costs per category, the large time investment (to be completed once every week); the fact that resource utilisation (and not only patient characteristics) is taken into account to develop case-mix groups.

Outcome measure: Diagnosis, a measure for dependence and a measure for the utilisation of resources.

Implementation: Funding of rehabilitation in France.

3.5.2.8 TAR-FIM [99]

Origin: TAR-FIM was developed by a team in Switzerland specific for neurological rehabilitation.

Oucome measure: Diagnosis, a measure for dependence and a measure for the consumption of resources.

Implementation: TAR-FIM was subject of an experiment. It is not clear if it was implemented.

3.5.3 Outpatient classifications

3.5.3.1 Home Health Resource Groups [98, 108]

Origin: The implementation of the prospective payment system for home health care in October 2000 in the USA.

Outcome measures: Outcome and Assessment Information Set (OASIS). OASIS is developed by the Centre for Health Services Research at the University of Colorado in the late 1980s and early to mid 1990s. The Oasis items were designed to measure, assess, and encourage improvement in care outcomes over time using Outcome-Based Quality Improvement processes.

Implementation: With the implementation of the prospective payment system for home health care in October 2000, information collected via OASIS was used for case-mix adjustment in establishing Medicare reimbursement. Overall, OASIS is used for outcome monitoring, payment, and as a core but not comprehensive clinical assessment.

3.5.3.2 Ambulatory Visit Groups [109-111]

Origin: Ambulatory Visit Groups (AVGs) were developed in the 1980's by the Health Systems research group at Yale University (USA).

"Ambulatory care has particular problems in the construction of appropriate case-mix measures, and day-case surgery provides an opportunity to test two existing measures, one inpatient (Diagnosis Related Groups) and one ambulatory (Ambulatory Visit Groups). These grouping systems were applied to the same data to compare the case-mix patterns that they produce. The findings show that Ambulatory Visit Groups appear to have advantages over the Diagnosis Related Groups with respect to their underlying assumptions and labelling of the groups; in particular, they assign greater weight to procedures. However, Diagnosis Related Groups are more developed, easier to use, more familiar and allow direct comparisons with inpatient care. Nevertheless, a proper evaluation of these issues requires further data collection and analysis, together with a fundamental examination of the uses of ambulatory case-mix." [109]

Outcome measures: AVG is a visit-based grouping methodology with 570 groups, which each categorizes visits with similar types and amounts of resource use.

Implementation: unknown

3.5.3.3 Ambulatory Patient Groups [112]

Origin: APG were developed by researchers at 3M Health Information Systems, Inc.(USA).

Outcome measures: Visits are grouped into 297 categories based on significant procedures, medical, and ancillary services provided.

Implementation: In the U.S., APG are the basis for Medicare's ambulatory prospective payment system.

3.5.3.4 Ambulatory Care Groups [113]

Origin: Adjusted Clinical Group (ACG) is a population/patient case-mix adjustment system developed by researchers at Johns Hopkins University School of Hygiene and Public Health in Baltimore, Maryland, U.S.

Outcome measure: ACG measures health status by grouping diagnoses into clinically cogent groups. The goal of ACG is to assign each individual a single, mutually exclusive ACG value, which is a relative measure of the individual's expected or actual consumption of health services. The primary conceptual basis is the expected persistence or recurrence of the condition over time. Other considerations included (in decreasing order of priority): Likelihood that the patient would have a return visit for the condition; Likelihood of a specialty consultation or referral; Expected need and cost of diagnostic and therapeutic procedures associated with the condition; Likelihood of an associated hospitalization; Likelihood of associated disability; and likelihood of associated decreased life expectancy.

Implementation: Only in experimental setting.

3.5.3.5 Duke Casemix System

Origin[114]: Dumix was developed in the U.K. to cater for the wide variety amongst patients encountered in geriatric medicine. Rehabilitation is part of the system.

Outcome measure: Dumix combines age, gender, patient-reported perceived and physical health status, and provider-reported or auditor-reported severity of illness to classify patients by their risk of high future utilization.

Implementation: Only in experimental setting.

3.5.3.6 Australian National Sub-acute and Non-acute Patient classification [15]

See Inpatient classifications

3.5.3.7 Other

Admission Casemix System for the Eldery (ACME), Australian Ambulatory Classification (AAC), Victorian Ambulatory Classification and Funding System, Efficient model.

3.5.4 Discussion

Only general information is available concerning the patient classification systems, the underlying rules are never published in detail. Anyway, no Belgian data set is available to test the applicability of the system to the Belgian situation.

A common feature of all mentioned inpatient classification systems, is that all of them use the results of a measurement of activities of daily living (FIM or Barthel Index) as main criterion for classifying patients and that all of them are used for financing of rehabilitation. The mentioned outpatient classification systems all use different criteria for grouping individuals and not systematically measure for activities of daily living.

For a further assessment of the advantages and disadvantages of the listed patient classification systems, the results of other research teams were summarised.

Concerning PCS for inpatient rehabilitation, the team at the University of Wollongong (see 3.5.2, Australian National Sub-acute and Non-acute Patient classification) concluded that the more variables were used to classify patients, the better the predictive value of the required resources. Of the compared PCS, FIM-FRG and AN-SNAP scored best. Selection of the 'best' classification involves a trade-off between simplicity and accuracy and whether the classification is already in use elsewhere, in order to benchmark. Concerning PCS for outpatient rehabilitation, this team concluded the preferred option was highly dependent on the model selected for the classification of inpatient care to facilitate transfers and follow up of individuals. [15]

A report was found including a comparison of Patient Classification Systems using predefined selection criteria without testing these instruments with a data set {Rapport rédigé par les membres du CoPil sur la base d'un travail de recherche de M.Nicolas Jeanprêtre, 2002, 104}. For this comparison, no distinction was made between in- and outpatient classification systems. MDS-PAC, AN-SNAP, PMSI-SSR, TAR-FIM and RUG-III were compared and AN-SNAP was selected model as the best patient classification system. The main comment on this system was that it does not include prognostic indicators for the medical evolution.

The preference for one or another patient classification system depends on the application possibilities. Ideally, a Patient Classification System supports patient referral to the most appropriate rehabilitation programme which is determining the required resources. The PCS currently used to support resource allocation show the important restriction that not the real rehabilitation needs are covered but rather the care needs by using the FIM and Barthel Index. The International Classification of Functioning, disability and health is not yet tested on validity related to patient referral and/or resource allocation, and as such is not ready to use yet. However, scientific work on this subject is going on, including research on how to convert the existing PCS to the future ICF-based PCS. Another problem is that for most PCS, it will be a challenge to tune an inpatient to an outpatient classification.

3.6 FRAMEWORK FOR SELECTION OF THERAPY

3.6.1 Introduction

In the definition of rehabilitation two conditions for therapy are:

- Interventions must be evidence based;
- Interventions must have a proven added value to achieve the defined goals.

Criteria to evaluate therapy concerning evidence, proven added value and quality are essential.

First, the focus is on criteria for the selection of interventions to compound a rehabilitation programme. Numerous factors influence the individuals' decision-making when planning care across the continuum. Patient, environment and disease related factors are critical. Taking these factors into account is essential in selecting appropriate intervention strategies in any disease stage. [115]

In chapter 8 models for quality assessment will be discussed. Current clinical practice in Belgium will be compared to clinical pathways developed in different countries (chapter 6 and 7).

The complexity and interaction of the criteria which determine a therapy plan for an individual, requires a framework permitting a health professional to have a detailed view on the individuals' situation. This is in contrast with the framework used for resource planning, which has to be easy manageable for financial analysts and policy-makers.

3.6.2 International Classification of Functioning, Disability and Health

The ICF model earlier mentioned, is probably the best candidate to serve as a framework for therapy planning. Studies reporting the application of ICF for therapy planning, were searched. One study of the application of ICF was performed for a well described pathology [116]. No papers are available, which report the application of these models for the whole set of pathologies requiring rehabilitation. An attempt was made through the development of linking rules to link the outcomes of ICF to useful interventions [96]. These linking rules are only a first step in the use of ICF as a connecting framework between interventions and outcome measures. A lot of study work is necessary to apply these or comparable rules in clinical practice.

3.6.3 The 3-hour rule

The US also struggles with the problem of therapy planning. The Centres for Medicare and Medicaid Services (CMS's) solved the problem by implementing a simple "3 hour rule". Strictly speaking the 3 hour rule is not a rule at all. The 3 hour rule is not specified in any regulation, and, therefore, it does not have the force of law. Nevertheless, CMS's viewpoint, that the "general threshold for establishing the need for inpatient hospital rehabilitation services is that the patient must require and receive at least 3 hours a day of physical and/or occupational therapy" has achieved such general acceptance that it has become a virtually unquestioned part of the rehabilitation services culture in the US. CMS's guidance on the 3 hour rule notes that the daily component of the rule may be answered by therapy services 5 days a week. Also, while most patients will answer the 3 hour rule through physical or occupational therapy, CMS recognizes that other therapies, such as speech therapy or prosthetic-orthotic services, may be required, within the 3 hours. Furthermore, if the patient has a secondary diagnosis or medical complication that rules out 3 hours of therapy a day, inpatient hospital care may nevertheless be the only reasonable means by which even a low-intensity rehabilitation programme can be safely carried out. However, in such cases, CMS requires justification of the existence and extent of complicating conditions affecting the carrying out of a rehabilitation programme.

3.6.4 Discussion

At long term ICF might be a good framework for therapy planning but not enough evidence is available yet to implement this now. This opinion is shared by some experts contacted (see attachments).

3.7 ACCREDITATION OF PROFESSIONALS AND SERVICES

3.7.1 Commission on Accreditation of Rehabilitation Facilities (CARF)

Because in scientific literature no information on the development and use of accreditation systems was found, grey literature was searched. The study of rehabilitation in The Netherlands, Germany, France, Sweden in a next chapter and the US will also focus on the use of quality systems in the concerned countries.

The CARF-system was identified as an internationally used accreditation system (Commission on Accreditation of Rehabilitation Facilities) [g]. CARF was formed in 1966 in the US by two national organisations - the Association of Rehabilitation Centres (ARC) and the National Association of Sheltered Workshops and Homebound Programmes (NASWHP) - that had been developing standards for their respective memberships for about a decade. In September 1966, the two organisations agreed to pool their interests in setting standards, and they formed the Commission on Accreditation of Rehabilitation Facilities, now known as CARF. In the years since its formation, CARF has steadily grown in size and stature.

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g http://www.carf.org/

The CARF family of organizations currently accredits more than 4,800 providers at more than 17,000 locations in the United States, Canada, Western Europe, and South America. More than 6.3 million persons of all ages are served annually by CARF-accredited providers.

After an organisation applies for accreditation of its services or programmes, CARF sends professionals in the field to conduct an on-site survey to determine the degree to which the organisation meets the standards. CARF surveyors also consult with staff members and offer suggestions for improving the quality of services.

CARF-accredited programmes and services have demonstrated that they substantially meet internationally recognized standards. CARF accreditation means that you can be confident that an organization has made a commitment to continually enhance the quality of its services and programmes, and its focus is on consumer satisfaction.

3.7.2 Accreditation systems in Belgium

In Belgium there are requirements for rehabilitation services, requirements for services related to a hospital stay during rehabilitation and accreditation criteria for physicians.

Requirements for rehabilitation services are included in the description of financing principles and differ per type of payment system (K30/K60, convention 9.50, convention 7.71). Requirements are related to team composition, opening hours, equipment and buildings. These requirements are discussed in detail in chapter 5.

Requirements for services related to a hospital stay are also conditions to be paid (B1 and B2: see chapter 5). Requirements include data registration concerning the activities related to social services and discharge management, participation to projects which contribute to the improvement of social services and discharge management, specific numbers of required full time equivalents (FTE) and some infrastructural issues.

Accreditation criteria for physicians influence the price of the honoraria and include a minimum participation to further training courses.

All these requirements and criteria are related to structure or process but no outcome measurement is performed.

3.7.3 Discussion

Accreditation or quality systems for professionals and services will be further discussed in the chapter concerning the international comparison of the five selected countries (chapter 8).

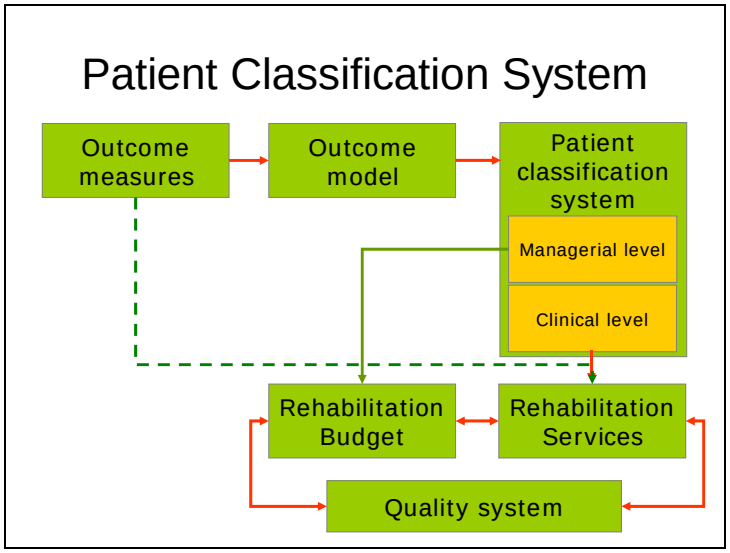
3.8 CONCLUSION

In this chapter, existing outcome measures, outcome models, assessment instruments, patient classification systems, criteria for the selection of therapy and accreditation of professionals and services, were discussed.

Exploring the published literature an ideal interaction between outcome measures, an outcome model and a patient classification system as a framework for the mapping of a rehabilitation programme as well as for resource allocation, was designed.

As proposed in Figure 3.2, outcome measures supply information to an outcome model. In this outcome model data related to diagnosis as well as level of function and environmental factors, should be covered. Starting from this outcome model a patient classification is built. One level in the hierarchy of this patient classification system serves as a framework for resource allocation (rehabilitation budget). Another level serves as a framework for the composition of rehabilitation programmes (rehabilitation services). The rehabilitation programme determines the resource allocation. Resource allocation as well as rehabilitation programmes must be controlled by a quality system.

Figure 3.2: Principles of an ideal Patient Classification System



This model is not applied (yet). Outcome measures, outcome models and patient classification systems exist. But no links are made yet between outcome measures and outcome models, nor links between outcome models and patient classification systems. Outcome measures are as such used in clinical practice. It should be kept in mind that existing patient classification systems group patients related to resource allocation (Length Of Stay), hence they are not satisfying to manage clinical patient referral. They can serve as a relative indicator to distribute the rehabilitation budget over resources independent of care needs and indeed are mostly used for financing purposes. These PCS are usually built upon the results of tools measuring dependence for activities of daily living, like FIM and the Barthel Index, which cover a very limited set of outcomes that are not fully representative for rehabilitation needs. However, because a lot of research is going on to convert the results of the FIM and the Barthel Index to ICF scores [117], it might be an option to implement FIM or Barthel Index at short term in Belgium, in order to line up with international tendencies. Also, it would allow to get some- although limited- information on the severity of functional impairment of patients treated in Belgian rehabilitation centres. Nowadays this information is not available.

ICF is widely accepted as the most complete instrument to describe functional impairment and rehabilitation needs. It can already be used as a conceptual framework although the application of ICF in clinical practice and for financing purposes only fits long term vision. The current main restrictions of ICF are the huge set of items to score, the lack of clear definitions to distinguish the content of the items mutually and the difficulty to convert the results of measurement tools to ICF scores. ICF core sets and ICF linking rules are already valuable attempts to compensate these restrictions. It can be considered to start a validation project using ICF core sets versus FIM or Barthel Index. Elements common to ICF core sets and FIM or Barthel Index are described in the Appendix to chapter 4.

An other option is to consider a novel research project in which an alternative approach should be developed to the objective of using ICF as the basis for a PCS which supports patient referral as well as resource allocation. In this research project, one should (instead of starting with the selection of existing tools) start with the selection of ICF items related to each of the ICF components (Health condition; Body function and structure; Activities; Participation; Environmental factors and Personal factors), which are supposed to be relevant for patient referral and/or resource allocation in rehabilitation. Next, one should identify measurement tools which cover one or more of these ICF items. Then, a new measurement tool for ICF items which are not covered by one or another existing measurement tool should be developed. Next, start registering the results of the selected measurement tools, and use the linking rules (still under development) to translate the

results of these measures to ICF scores. Finally, analyse the collected data on their utility in a PCS. Groups within this PCS must be homogeneous related to required rehabilitation services and indirectly to required resources. A comparable approach was respected by the Division of Health Care Policy and Research at the University of Colorado at Denver for the development of a Uniform Patient Assessment instrument for Post-Acute Care. Their instrument is intended to cover the population in different rehabilitation settings and must facilitate placement decision-making, enhancement of safety and quality of care transitions through transmission of core information to a receiving provider and provision of baseline information for longitudinal follow up of health and function [100].

Key points

- **The conceptual definition of musculoskeletal and neurological rehabilitation has to be translated into practice to facilitate decisions on the organisation and financing of rehabilitation.**
- **A patient classification system is required to structure inflow of individuals (What?) and determine the type and intensity of required interventions (How?), the professionals to be involved (Who?) and the preferred organisation (Where?).**
- **Outcome measures, outcome models and patient classification systems exist. But no links are made between outcome measures and outcome models, or between outcome models and patient classification systems.**
- **ICF can already be used as a conceptual framework for an outcome model but the application of ICF in clinical practice and for financing purposes only fits long term vision. A lot of research is going on about this subject.**
- **ICF's success depends on its compatibility with measures used in rehabilitation and on the improvement of its applicability.**
- **FIM and Barthel Index are tools measuring the level of dependence related to activities of daily living, but neither FIM nor Barthel Index measure rehabilitation needs. However, in some countries they are used in Patient Classification Systems implemented for resource allocation.**
- **Most of the existing PCS are specific for inpatient or for outpatient care. An exception is the Australian AN-SNAP, derived from the FIM-FRG-system.**
- **In order to test existing PCS in Belgium, datasets from Belgian rehabilitation patients are necessary.**
- **A short term option could be to implement the registration of FIM or Barthel Index in Belgian rehabilitation centres, in order to get some – although limited- information on the severity of functional impairment of rehabilitation patients.**
- **To line up with international tendencies, it could be considered to start a validation project using ICF core sets versus FIM or Barthel Index.**

4 REGISTERED DATA AND PATIENT PROFILES

4.1 BACKGROUND

In chapter 3 an extensive description has been made of the different scales used to measure outcomes of rehabilitation within the scope of organizational/financing purposes. Rehabilitation scales and/or datasets are already in use in some countries in order to classify patients for organizational/financing purposes.

The approval of ICF as an internationally accepted classification of functioning, has stimulated the analysis of existing measures and scales. Major efforts on this part are being done by the "*ICF branch of WHO*". A systematic review by this group [118] made an inventory of different measures used in acute and post-acute rehabilitation and compared it to ICF. The authors conclude that at this stage no real standard validated scales measuring (clinical and functional) characteristics of rehabilitation patients are readily available that cover most/all aspects of ICF. At the same time ICF-concepts covered by the individual rehabilitation scales vary a lot. This means that currently, no existing validated rehabilitation scale is able to differentiate rehabilitation units and pathologies on basis of the (clinical and functional) characteristics of patient populations, and at the same time fit to the ICF-model.

The use of ICF itself as a managerial and financial tool is still under development (see chapter 3); and many problems still have to be solved.

Taking into account these observations, this chapter has a practical purpose. In Belgium, the only formal registration system currently used in the hospital sector, including indicators of functionality of the patient, is the minimum nursing data set. A quick scan of literature was performed to assess to what degree current nursing registration systems could be used to describe and compare patient populations in rehabilitation settings and to what degree these datasets could be used for rehabilitation managerial purposes. In a second part we illustrate how profiles of Belgian minimum nursing data can differentiate the characteristics of rehabilitation facilities. A third part brings some examples of internationally accepted. Rehabilitation scales that are in use in some Belgian rehabilitation centres and sometimes are already used for organizational purposes at the level of the own hospital.

4.2 A QUICK SCAN OF AVAILABLE LITERATURE

4.2.1 Methods

A quick scan of the databases Medline (through PubMed), CDC, CRD, Econlit and Cinahl was done in November 2006.

Following search terms were used: Rehabilitation, Rehabilitation Science, Rehabilitation research, Rehabilitation centers, Disability evaluation, Severity of disability, International classification of functioning, disability and health or disability, Patient classification, minimum data set, Research instruments, Rehabilitation or Clinical assessment tools, outcome assessment, Functional assessment , Rehabilitation patients, FIM(keyword), subacute care, Barthel Index, Disability evaluation, Functional status, Functional assessment, Instrument validation, Clinical assessment tools, Brain injuries, or Cerebral Vascular accident or Activities of daily living, Physiotherapy, Physical therapy.

The search was general. The selection of the articles was based on the title and abstract. As could be expected, the majority of literature found on nursing data sets focuses on the use of datasets for nursing issues and on the ability to use large clinical nursing datasets to assess the effectiveness of nursing interventions. There is an extensive literature on nursing terminology, on information models and standards for nursing datasets[h]. All

[h] The FOD-MVG 2 report makes an extensive overview of internationally available nursing data sets and scales

articles solely reflecting on nursing issues were excluded, if no reference is made to functionality, levels of dependency, as a measuring issue.

Additional documents, especially on the Belgian situation, were retrieved through web-site search, and contacts with individual experts dealing with minimum nursing data.

4.2.2 Minimum nursing data and rehabilitation: the literature

It has been argued that outcome measures are an important tool in quality assurance procedures, also in the accountability process of justifying expenses and resources. But it has been demonstrated too, that there is a great heterogeneity of outcome measures over Europe [90]. Numerous available measures try to assess aspects of functioning, but they vary greatly in underlying dimensions and constructs [18].

A systematic review of measures used in rehabilitation [118] compared available measures to the ICF. The review finds that the FIM, Barthel Index and Glasgow coma scale are the most cited assessment instruments. All other formal assessment instruments, were applied in less than 10% of the studies selected. A recent exercise validated the ICF core sets for early post-acute rehabilitation facilities, comparing it with FIM, Functional Assessment Measures (FAM) and Barthel Index (BI), [117]. (See also Appendix for comparison of ICF core sets, FIM and BI). The authors conclude that FIM and Barthel code abilities to the level of independence and need of assistance, without explicit reference to the environment. Many aspects of human functioning are not measured by FIM, FAM and BI. The authors recommend that, especially for acute neurological conditions, additional items (besides the ones coded in FIM and BI), need to be coded if the scores are to be used for prospective payment aims.

Only few articles have focused on a comparison of nursing datasets and rehabilitation outcome scales, mainly from an American background. The American Minimum Data Set (Version 2.0) is an American, federally mandated nursing assessment conducted on every resident of a skilled nursing facility. Authors have argued that it could be used as a simple tool to collect data and measure outcomes for individuals who receive rehabilitation in the skilled nursing facility.

In 1998 a "crosswalk" was developed between the FIM, measured in acute rehabilitation settings and the American minimum dataset (MDS) developed for nursing homes. [119]. A pseudo-FIM was developed rescaling MDS-items to correspond to FIM-items. Pseudo-items could be defined for 12 of the 18 FIM items (8 motor and 4 cognitive items). Based on the testing of the instruments it was argued that FIM and MDS items can be used to predict item and subscale scores between the two instruments with reasonable accuracy. It could thus be used to compare case-mix between acute rehabilitation and nursing home rehabilitation on the level of effectiveness (degree of improvement among similar patients) and efficiency (cost of care to obtain a given degree of improvement) of rehabilitation care in different types of settings.

Morris et al. [120] assessed the validity of standardized assessment data collected with the Minimum Data Set (MDS) in post-acute care settings. This assessment was done for the development of performance indicators. Performance indicators derived from information collected with the MDS demonstrate convergent validity with data collected with other research or standardized assessment instruments. Results were most favorable for areas of physical functioning, cognitive and communicative functioning, and clinical complexity.

Bryant et al [121] compared the medical outcomes short form SF 36, the MDS for Nursing Home Resident Assessment and Care Screening which is a major component of the RAI (Resident Assessment Instrument for long-term care), FIM and IRF-PAI (Inpatient Rehabilitation Facility-Patient Assessment Instrument). They observed that all evaluated datasets include items that assess ADL, ambulation and locomotion, and neuro/emotional/behavioral status (primarily cognition and depression). All except the SF-36 contain items concerning sensory status (eg, vision, hearing, speech), (in)continence, and some measure of physical ability. But the instruments do not specify the data items identically or have identical response options. Items differ in perspective; qualification; source (patient and/or caregiver); and action versus outcome or tool (eg, walking vs wheelchair). Time periods covered also vary considerably. Based on this observational

analysis of the scales, obstacles are seen to the development of a standardized approach to post-acute care quality assessment related to the potentially different characteristics in patient populations served by different types of providers. Bryant et al conclude that it may not be possible to construct a single dataset that by itself meets all needs in each setting. However, a single core set of measures applicable to all settings is considered to be useful for assessing quality, facilitating transfers between providers, and minimizing any data collection burden for healthcare professionals.

4.3 THE BELGIAN NURSING MINIMUM DATA SETS

4.3.1 Background

The Belgian Nursing Minimum Data Set (BNMDS) is a registration of nursing activities implemented nationally in 1988. Four times per year, during a two-week period, patients in hospitals are scored on the level of nursing activities. The results of these scores are presented as so called "fingerprints" of hospital departments, projected on a national map. The reference for this national comparison is the "average" Belgian nursing unit.

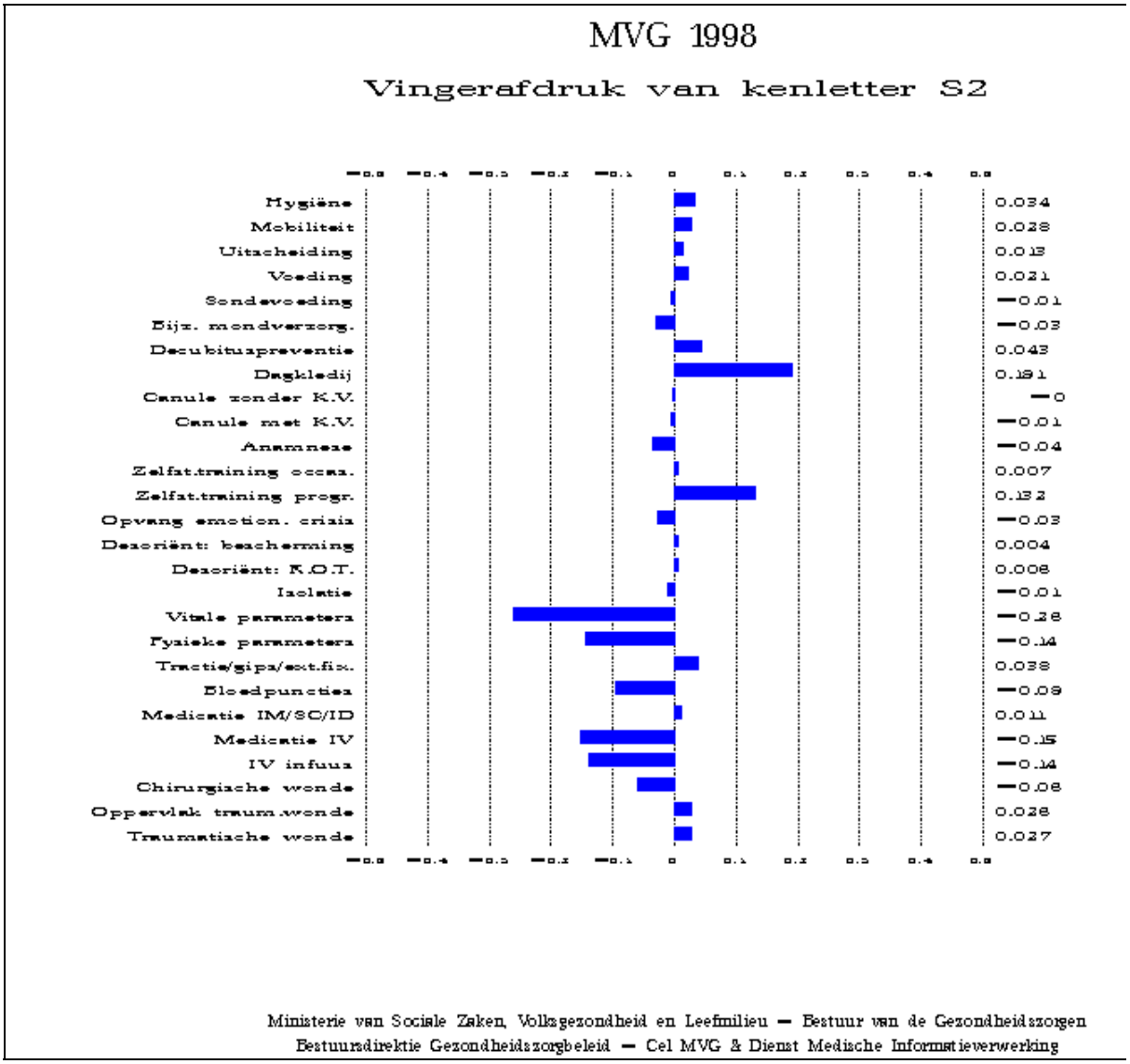
4.3.2 Fingerprints of rehabilitation departments

The fingerprints identify the nursing care on a nursing department organised around 23 activities (see Appendix to chapter 4) The fingerprint is presented as horizontal histogrammes for each of the 23 dimensions. Each variable is scored between -0,5 and +0,5. A score 0 implies that the department scores identical to the average Belgian nursing department. The calculations of the scores are based on a Ridit-analysis.

- Example: The reference value 0 for the dimension "hygiëne", is based on the observation that 35% of the patients in general hospitals is not getting help in hygienic care, 30% is receiving supportive help, 20% partial help, 15% full help. Each nursing unit is then compared to this reference point. A higher percentage patients needing a higher level of care, will lead to a positive score on the fingerprint. A lower percentage of patients needing more care will lead to a negative score

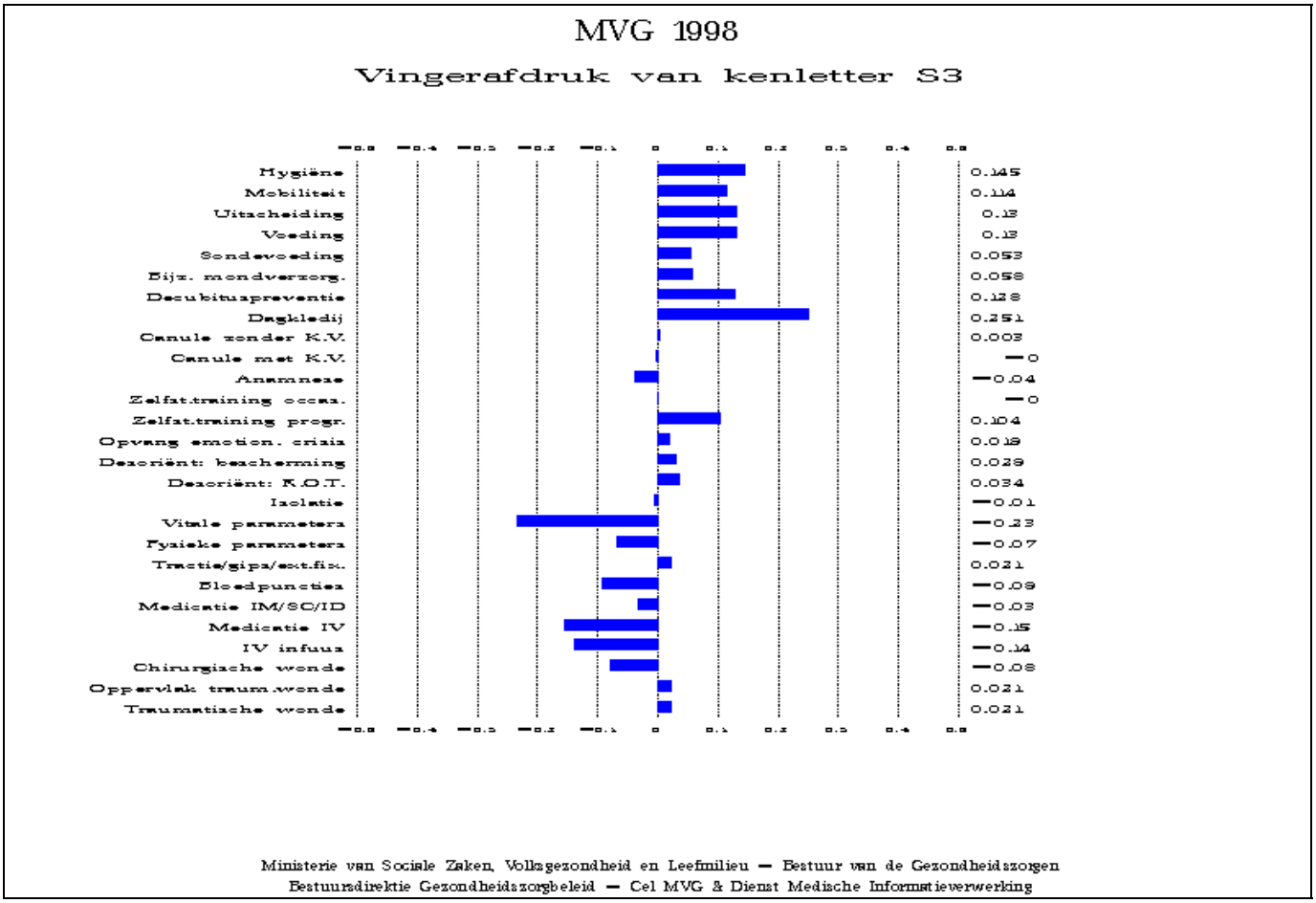
Figure 4.1 is an example of a 1998 fingerprint of an average Belgian "locomotor" rehabilitation department, and Figure 4.2 of an average Belgian "neurological" rehabilitation department. These average departments are characterized by a large (always compared to the average nursing unit) amount of basic nursing care (hygiene, mobility, excretion and nourishment), a lot of day clothing tasks, comfort care (special mouth care and pressure ulcer care), and training for independency (programme). The units have little technical nursing care. Figure 4.2 shows a similar fingerprint of an average Belgian neurological rehabilitation department.

Figure 4.1: Fingerprint of an average Belgian "locomotor" rehabilitation department (1998)



(Source: Federale Overheidsdienst (FOD) Volksgezondheid, Veiligheid van de Voedselketen en Leefmilieu: https://portal.health.fgov.be/portal/page?_pageid=56,698710&_dad=portal&_schema=PORTAL#fb2000)

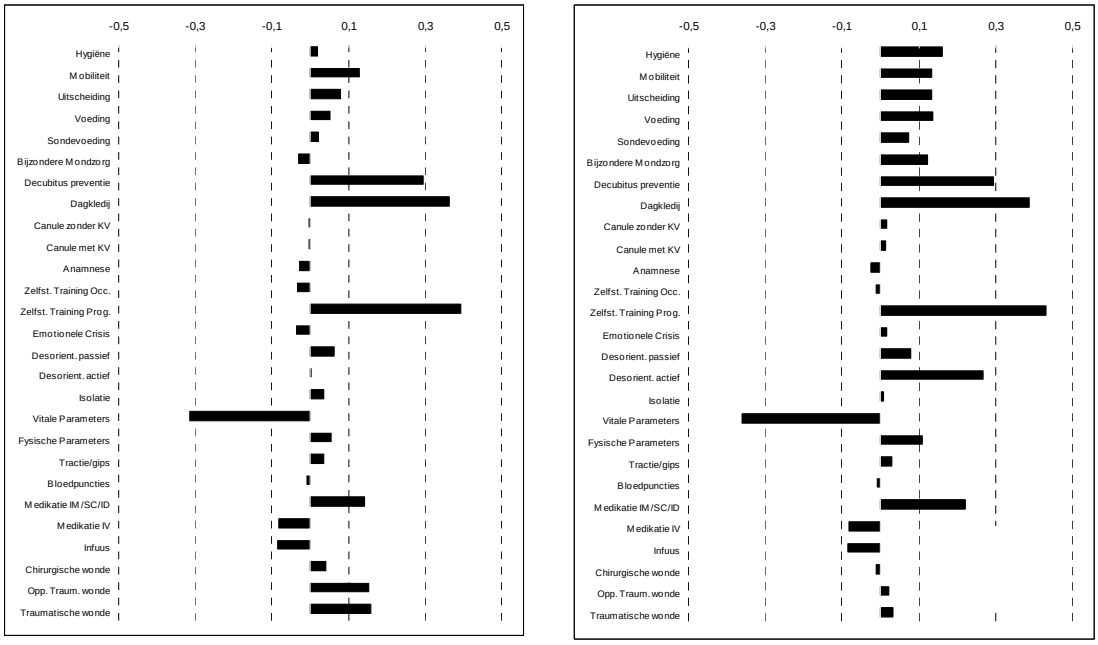
Figure 4.2: Fingerprint of an average Belgian "neurological" rehabilitation department (1998)



(Source: Federale Overheidsdienst (FOD) Volksgezondheid, Veiligheid van de Voedselketen en Leefmilieu: https://portal.health.fgov.be/portal/page?_pageid=56,698710&_dad=portal&_schema=PORTAL#fb2000)

Each individual hospital department can be compared to this general picture. Figure 4.3 presents (as an example) the fingerprint of the locomotor and neurological rehabilitation departments of a large academic university centre.

Figure 4.3: Fingerprint of the locomotor (left) and neurological (right) rehabilitation departments of a large Belgian academic university centre (1998).



The graphs show a small difference of the units on detailed aspects, but the overall picture for the different rehabilitation units remains the same. This graph illustrates that hospital units can be profiled using the minimal nursing data. As such it could be considered to reflect further on this profiling in order to get more rehabilitation specific information.

4.3.3 Revision of the Belgian Nursing Minimum Data Set

Due to important changes in hospital practices, and percieved shortcomings of the original BNDMS, a revision of the data set is prepared . The process of revising the (B-NMDS) started in 2000.

The Nursing Interventions Classification (NIC) was selected as a framework for the revision of the original BNMDS. Different items were seen as priorities for the revised BNMDS: hospital financing, nurse staffing allocation, assessment of the appropriateness of hospitalisation, and quality management. The revised version (MVG-RIM2) will allow a more detailed profile of the patients. The instrument is built on 4 levels. It is an open registration of 76 items (as opposed to the 23 in the MVG-RIM1). Each of the 76 items hold two or more aspects. These 76 items are grouped in 21 classes and 6 domains. (see Appendix to chapter 4)

Nationwide implementation of the new MVG is foreseen the earliest by January 2008. [122]

MVG-RIM2 (see Appendix to chapter 4) is expected to be able to respond in a more exhaustive way to document the nursing care needs of the patients, including cognitive aspects. It would also enable to compare "what has to be done" with "what is done". It is also expected that MVG-RIM2 is a registration that enables to document the intensity of nursing care both needed and offered.

However, the MVG-RIM2 is not a tool enabling to score for other paramedical (occupational training, physical therapy, psychology,…) and social needs and activities. Moreover an ongoing preliminary analysis of potential use of MVG-RIM2 on geriatric wards (KCE), seems to indicate that MVG-RIM2 is not a tool to monitor or assess the effectiveness of therapy and different aspects of rehabilitation activities. Last but not least, it is developed for use in hospitals, and does not allow to collect information on ambulatory services (except some specific day hospital activities).

4.4 INTERNATIONALLY ACCEPTED REHABILITATION SCALES USED FOR ORGANISATIONAL AND FINANCING PURPOSES

As already pointed out in chapter 3, specific organisational and payment systems in rehabilitation medicine use FIM and Barthel-Index. These scales are considered to be suitable for organisational and financing purposes in rehabilitation. FIM and Barthel-Index (BI) are used for clinical purposes in some Belgian rehabilitation centers. The scales are not used in all rehabilitation facilities.

As mentioned[117] these scales do not cover all the domains proposed by ICF, accepted internationally and endorsed by WHO as a general framework in rehabilitation medicine. (See Appendix to chapter 4 for comparison of ICF core sets for post-acute rehabilitation, FIM and BI). However, the use of ICF itself as an organizational and financial tool is still under development; and many problems still have to be solved. Until this work has proceeded, some initiatives could be launched to use the FIM and Barthel Index at a more generalised level in Belgium, alike some other countries.

Figure 4.4 shows the kind of information that can be generated by a systematic use of these scales. Average FIM and/or BI are shown for 2 Belgian rehabilitation services (one tertiary referral hospital and one secondary level general hospital) that already use these scales for clinical purposes. It are illustrations for those specific hospitals and should not be generalized to all Belgian rehabilitation centres.

Figure 4.4 X represents the average outcome for patients admitted to the rehabilitation ward (BI at admission compared to average BI at discharge).

Figure 4.4 Y is a longitudinal comparison (two years) of the average BI for a rehabilitation ward.

Figure 4.4 Z represents average FIM-scores at admission and at first follow-up evaluation for 2 patient groups: stroke and spinal cord injury (SCI). In this last example, it would be even more appropriate to compare the subscales of the FIM-score (motor and cognitive subscale), which on average is very different for these 2 pathologies, but this is beyond the scope of this exercise.

Figure 4.5 represents the average disability level for different months of the year in three different rehabilitation wards in the same hospital, measured by BI.

Figure 4.4: Average disability level of patients for different months of the year in 3 different rehabilitation wards in the same hospital, measured by Barthel Index.

Fig. (X): Average Discharge Barthel Index for a given Admission Barthel Index.
(Source: Rehabilitation Service (S2 beds), Virga Jesse Hospital, Hasselt)

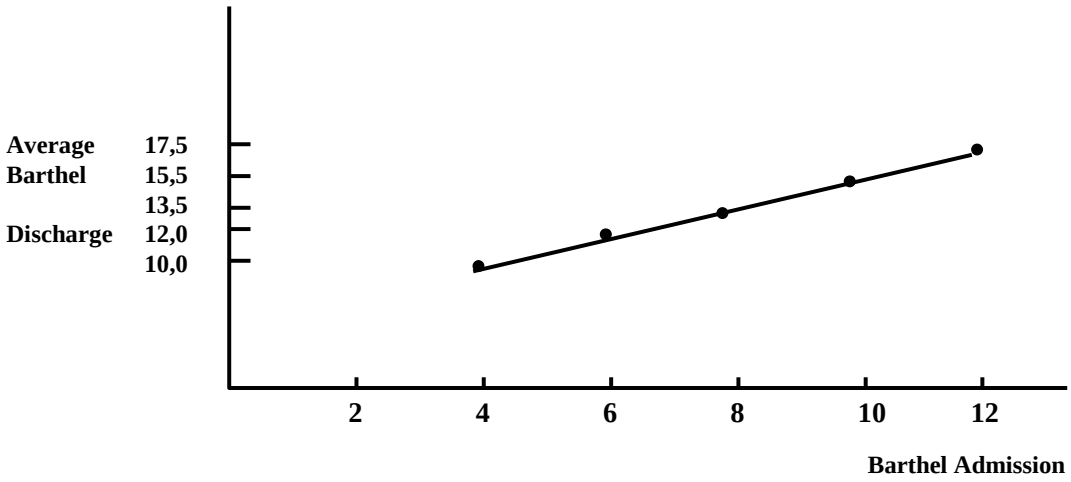


Fig. (Y): Barthel Index (BI): Average Admission BI (all patients) and Average Discharge BI (all patients) for 2001 and 2002.
(Source: Rehabilitation Service (S2 beds), Virga Jesse Hospital, Hasselt)

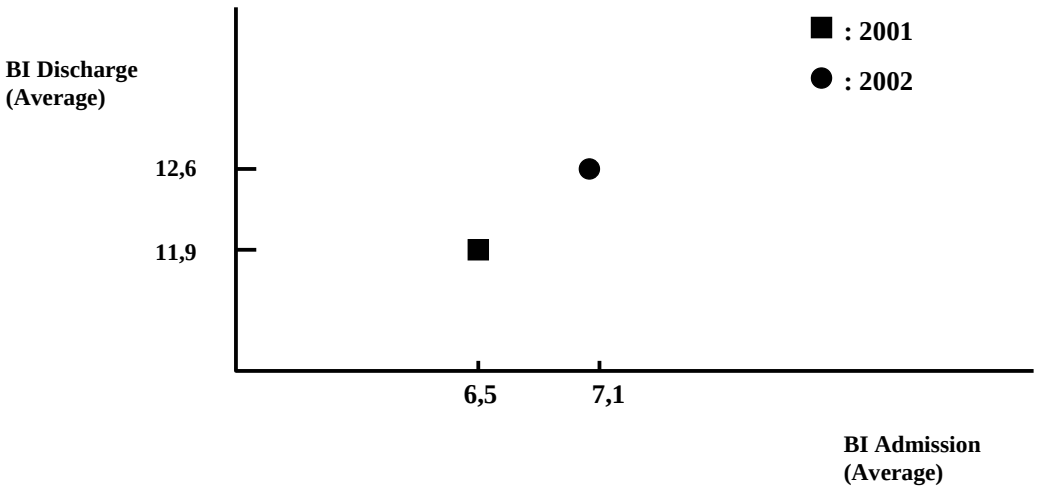
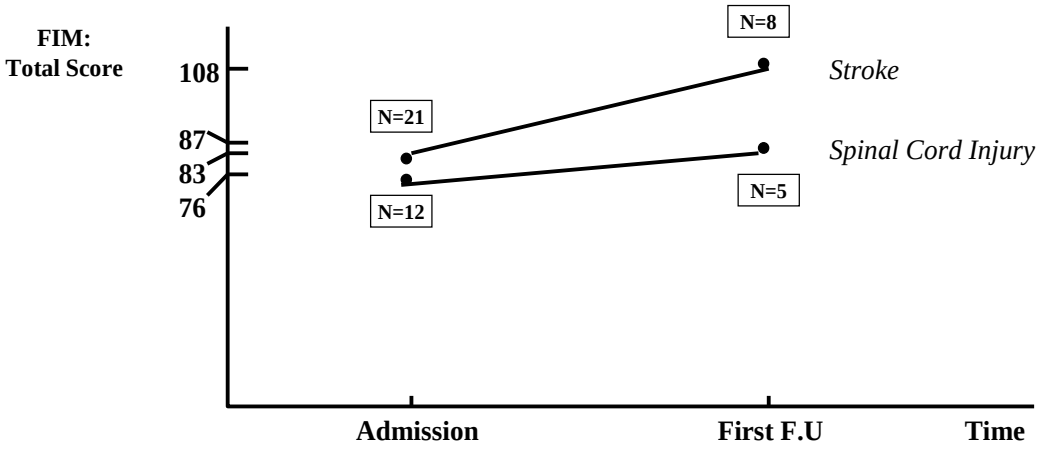


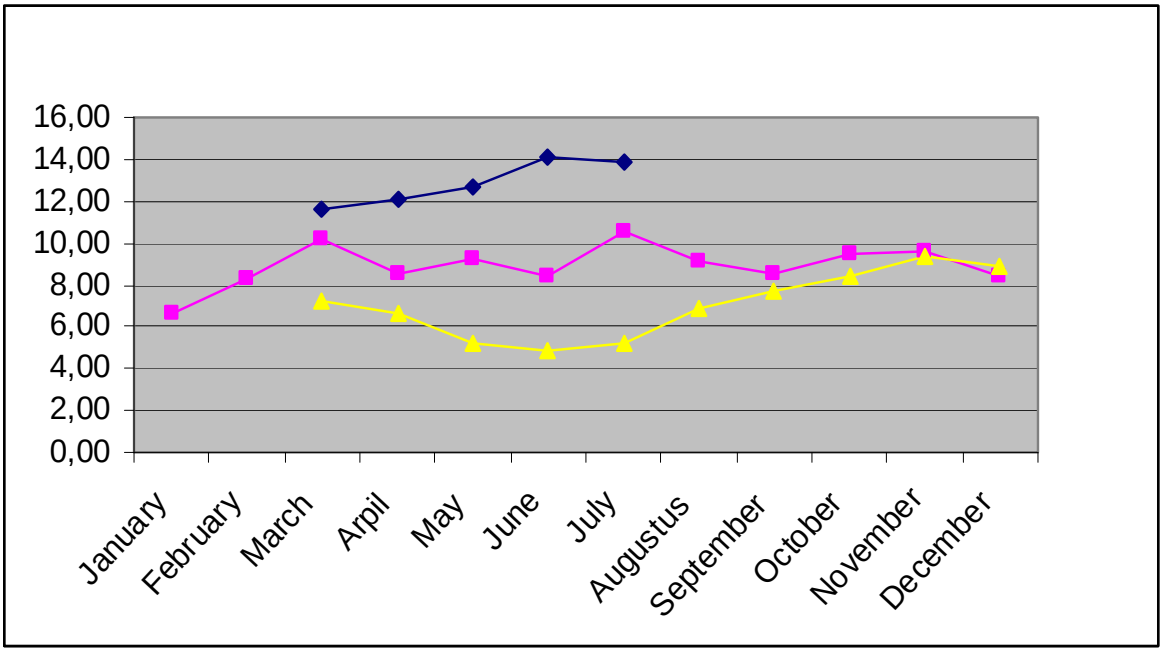
Fig. (Z): Average Total FIM Score for Stroke/Spinal Cord Injury (SCI) at admission and first follow-up.

(Source: Rehabilitation Service, University Hospital Pellenberg-Leuven, Pro-Esor Study (1999-2000)).



Source: Rehabilitation Service, University Hospital Pellenberg-Leuven, 2005

Figure 4.5: Average disability level of for different months of the year in 3 different rehabilitation wards in the same hospital, measured by BI



4.5 CONCLUSIONS

Currently, rehabilitation activities are not registered. Even more, the Belgian health care system is not using validated measures enabling to differentiate the different profiles of rehabilitation facilities, especially not for pathology specific characteristics. Since literature is offering some indications that minimum nursing data sets could potentially, with the necessary critical attitude, be used and further adapted for comparing rehabilitation units, it could be considered to use MVG-RIM2 as an intermediate profiling tool, using the fingerprints. It would be an intermediate tool during the period that more detailed rehabilitation registration systems are developed. The fingerprints could be used as a proxy to monitor and compare the condition of the patients within the units.

However, the necessary reluctance is needed if MVG-RIM2 is intended to be used for other than nursing purposes. MVG-RIM2 is not intended for measuring rehabilitation specific purposes. Moreover, MVG-RIM2 is not allowing for pathology specific comparisons without a coupling with other datasets (MKG-RCM). If considered, the use of MVG-RIM2 should go hand in hand with thorough scaling comparisons with focused rehabilitation measures, as MVG-RIM2 is developed for nursing and not for rehabilitation purposes. The "cross-walk" exercise described in the literature, could be an example of how to deal with this issue. Last but not least, it should be kept in mind that MVG-RIM2 is developed for inpatient registration and not for routine registration of outpatient or ambulatory services.

A more laborious strategy to exploit existing datasets, could consider the coupling of MVG-RIM2 with Minimal Clinical Data (MKG-RCM) and Minimal Financial Data (MFG-RFM) sets, for identifying rehabilitation activities. The MKG-RCM is a tool to differentiate on therapeutic activities. But some particular limitations have to be taken into account. The minimal clinical data set is limited to a registration of physical therapy activities, (as defined in art 7 of K.B. 18.12.2002). Medical acts that are provided in the framework of multidisciplinary rehabilitation (art. 22 K.B. 17.07.1992) will require a coupling with Minimal Financial data.

Moreover there are some methodological issues to consider, when coupling datasets. To make accurate analyses of MKG-RCM data for rehabilitation purposes, one should only take into account stays in both acute and rehabilitation phases for which rehabilitation activities are done under K-nomenclature, or convention 9.50 or 7.71. It is the only strategy that enables to trace back the main diagnosis (via the "number of stay" (*verblijfsnummer*)). Only focusing on the registration data in rehabilitation units makes it almost impossible to trace back to the causes for rehabilitation. Code V57(.x), used for the registration for rehabilitation activities, does not require a registration of the original problem. Some secondary diagnosis for "late effect" coding is theoretically possible, but often not registered in daily practice, as this has no impact on the financing.

Congruent with the international agenda, further efforts are needed to develop a specific rehabilitation registration system. In order to avoid over-registration on the ward and guarantee accurate exploitation of these date, some reflections and validation exercises are needed to fit this specific registration module in other registration models. As already mentioned in chapter 3, other countries use specific rehabilitation scales like FIM and Barthel Index for organisational and financing purposes in rehabilitation facilities. These scales, although not routinely registered in Belgium, are used in some Belgian hospitals for clinical purposes. It could be an option to introduce one of these scales in the Belgian registration system, to validate it for Belgium and to compare this exercise with experiences at the international level. An advantage of this approach would enable an international comparison of the Belgian situation, from the clinical point of view as well as from the organisational and financing point of view. One of the disadvantages however, could be the augmentation of the administrative burden that is already high in this part of medical practice.

Key points

- **In literature some efforts have been described to assess the use of minimum nursing data in post-acute rehabilitation. Different American datasets, used for different settings providing post-acute rehabilitation care (acute rehabilitation hospitals, nursing homes), all include items that assess ADL, ambulation and locomotion, and neuro/emotional/behavioural status. Although the instruments do not specify all data items identically, it seems to be possible to construct a single dataset that makes it possible to compare post-acute rehabilitation needs in different settings.**
- **In Belgium only MVG-RIM includes functional items. It could be considered to use MVG-RIM as an intermediate profiling tool of post-acute rehabilitation, using the "fingerprints".**
- **However, the necessary reluctance is needed before starting to use MVG-RIM: it is not a tool developed to score for therapeutic (occupational training, physical therapy, psychology,…) activities, neither to monitor or assess the effectiveness of therapy or different aspects of rehabilitation activities. Validation will be necessary. It could be an option to validate MVG-RIM with FIM or Barthel Index, or with other instruments currently tested in other countries. It should be kept in mind that MVG-RIM can only be used for inpatient registration, and not for outpatients.**
- **The coupling of MVG-RIM with Minimal Clinical Data (MKG-RCM) and Minimal Financial Data (MFG-RFM) sets could be included in this validation exercise. But there are important methodological issues to take into account, related to the particularities of these Belgian registrations concerning the field of rehabilitation.**
- **Congruent with the international agenda, further efforts are needed to develop a specific rehabilitation registration system, enabling to monitor the patient-profiles and rehabilitation activities in post-acute care. One should line up with international efforts and initiatives to develop validated registration instruments in line with the ICF-concept, and to integrate these with existing registration systems.**

5 DESCRIPTION OF THE CURRENT ORGANISATION AND FINANCING OF MUSCULOSKELETAL AND NEUROLOGICAL REHABILITATION IN BELGIUM

5.1 DESCRIPTION OF THE BELGIAN FINANCING SYSTEM FOR MUSCULOSKELETAL AND NEUROLOGICAL REHABILITATION

5.1.1 Introduction

In order to understand the complex Belgian financing system, first a typology for provider payment systems is presented, which is then applied to the financing system of rehabilitation in Belgium, concerning hospital stay as well as rehabilitation activities. Then, the different payment systems in Belgium are described in detail. In the final section of this chapter a summary of the different actual payment systems, classified according to the typology model (focussing on financial incentives created by these payment mechanisms) is presented.

5.1.1.1 Typology for provider payment systems in health care[123]

This section is based on (health) economic literature on the incentives created by different payment reimbursement mechanisms. Consequently, typical assumptions (and the associated terminology) from economic theory will be used.

Ideally a payment scheme should incorporate the right incentives for providers (e.g. physicians and hospital management) to ensure good quality of the health care provided on the one hand and to contain overall health care costs on the other hand. Payment mechanisms should therefore seek to resolve quite distinct (and sometimes contradictory) challenges facing the players in the health care system, i.e. patients, physicians, hospitals, insurers and government.

It has often been argued that it is therefore necessary to separate the financial self-interest of the physician (and other health care providers) from his role as patient advocate. Otherwise a physician's clinical judgement about patient care and the subsequent course of treatment may not only depend on the well-being of the patient, but also on his own financial interest. Another potential conflict could arise between the micro and the macro level : what is best for an individual patient is not always best for society [124].

A review of the literature on physician payment methods and health services reimbursement schemes reveals four major payment systems : fee-for-service (FFS), capitation, salaried and fee-for-time (FFT) [125] [126]. These four basic payment or reimbursement systems can also be mixed in various ways. Each of these pure methods has its own characteristics with specific consequences which will lead to a distinct type of practice setting and which will create different incentives. A FFS system will often lead to excessive consultations, interventions and prescriptions, while a capitation system could potentially lead to a selection of good risks, implying that (on average) the level of health services provided will be suboptimal. From a cost point of view, a capitation payment mechanism will create incentives to adopt a cost-conscious way to treat patients [127]. On the macro level and focussing on policy and budget, it can be argued that the lack of control and accountability in an open-ended system (especially FFS) makes planning difficult and will often lead to a chronic overrunning of the budget. It should be noted that under (risk-based) capitation financing and supply-side cost-sharing, policy makers should be concerned that the incentives resulting from these mechanisms may distort a physicians' clinical judgement [124].

An underlying assumption of the majority of classical economic models is that the level of all outputs is determined exogenously, i.e. by the demand of the patients. This assumes

that physicans are perfect agents for their patients and, consequently, that they have full information about their patients' utility function and that their own preferences are not influencing the course of the treatment.

Closely related is the issue of supplier induced demand (SID). Notwithstanding the fact that the SID hypothesis has been the subject of numerous (health economics) studies, its exact definition is still open to debate. However, after examining different possible definitions, McGuire (2000)[128] suggests the following definition : "SID exists when the physician influences a patient's demand for care against the physician's interpretation of the best interest of the patient". It is the amount of demand created by the supplier (doctor), who is acting as agent for the consumer (patient), which exists beyond what a fully informed patient would have chosen freely[i]. Crucial elements of SID are the existence of asymmetric information regarding the patient's health status and need for health care, combined with an imperfect agency relationship between patient and physician[j]. If physicians then maximise their own profit instead of the utility of the patients, they will induce a shift in demand curve. Additional favourable conditions for SID are a fee-for-service reimbursement system and excess supply. Although numerous studies have found empirical support in favour of the existence of SID, there is no conclusive empirical evidence (e.g. McGuire (2000)[128] and Ferguson (2002)[130]).

A typology to classify provider payment systems from an incentive point of view is developed by a Belgian team of experts in health economics [k]. Following the typology model for provider payment systems in health care by Jegers et al. (2002)[123], which was based on an extensive study of the literature until 2000, the different current financing systems for musculoskeletal and neurological rehabilitation in Belgium will be classified. Incentives created by the various reimbursement mechanisms will be highlighted. In a standard health economics setting it is assumed that providers will try to maximise profits implying that different payment mechanisms create incentives that may change the clinical behaviour of health care providers. From the point of view of the sponsor (insurers, government, …) non-appropriate reimbursement mechanisms may lead to undesired behaviour of providers. The typology model classifies payment systems according to two dimensions: on the one hand fixed versus variable systems and on the other hand retrospective versus prospective systems (Figure 5.1).

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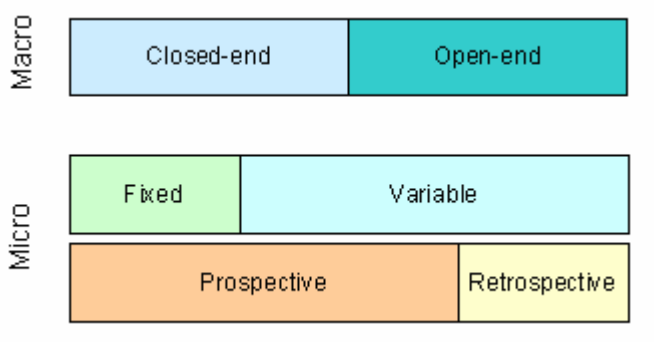
[i] Opponents of the SID assumption argue that doctors believe in the efficacy of their treatments and believe that more of them are better. From this perspective SID is nothing more than the use of medical capacity to its limit[129].

[j] The principal-agent framework is often used in health economics to describe the patient-doctor relationship. The specialised agent (physician) who has superior medical information makes treatment decisions on behalf of the uninformed principal (patient).

[k] Marc Jegers (Free University of Brussels (VUB), Micro Economics of the Profit and Non Profit Sectors), Katrien Kesteloot (University Hospitals, Leuven; Catholic University of Leuven (KU Leuven), Center for Health Services and Nursing Research), Diana De Graeve (University of Antwerp (UFSIA), Department of General an Public Economics) and Willem Gilles (Catholic University of Leuven (KU Leuven), Center for Health Services and Nursing Research)

Figure 5.1: Typology for provider payment systems in health care.



Source: Jegers, Kesteloot, et al. – 2002 [123]

The macro level is the level of the sponsor. A closed-end system is a financing system that is fixed at the macro-level. Policy-makers (insurers, politicians) determine a ceiling of expenditures, which may not be exceeded during a certain period. Corrections are made if the budget is overrun (or is likely to be overrun): a distinction is made between a 'hard cap' and a 'soft cap'. In case of a 'hard cap' no exceeding of the ex ante defined budget is possible. In case of a 'soft cap' exceeding of the budget is possible but corrections, for example in prices, are applied in this case. An open-end system is a financing system without any budget limits either on a global level or for certain health care expenditures.

The micro level is the level of the individual provider. The distinction between a fixed and a variable payment system is based on the (absence of a) relationship between activities (production) of a provider and the payment (income) he receives. In a variable system, the provider has an ability to influence his earnings by varying his activities, contrary to fixed systems where the provider receives a lump sum determined ex ante and not related to his production. In a profit maximising setting, economic theory predicts that providers will produce until the marginal revenue equals the marginal cost of production. Production (e.g. number of consultations, activities, …) will therefore depend on the fee and on the cost of providing an additional unit. Consequently variable systems with relatively generous fees will probably lead to overproduction. In a fixed payment system where the provider receives a lump sum per unit (e.g. patient, period, …), marginal benefits of production within the unit are zero. Therefore providers will have strong incentives to reduce marginal cost (e.g. by reducing the number or intensity of activities per unit or by selecting good risks). However, providers can still attempt to increase the number of units in order to gain more income (e.g. within a fixed per diem payment increasing activities does not generate additional payments, however an additional day produces an extra income).

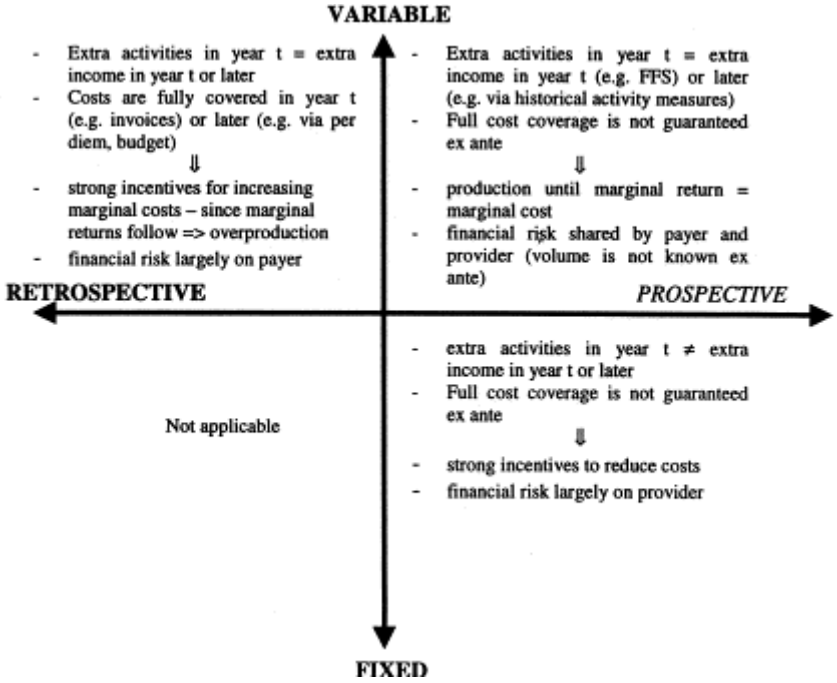
The second dimension to classify reimbursement mechanisms is the distinction between retrospective and prospective reimbursements, pointing to the link (or absence of a link) between income of the provider and his actual cost of producing a service. In a retrospective system, ex post reimbursement is based on real costs, implying that incentives to reduce costs are very weak. In a prospective payment system reimbursement rates (e.g. Belgian nomenclature fees) are determined ex ante, without any link to real cost of an individual provider, creating incentives to increase efficiency and contain cost on the one hand and to select good risks and to provide a suboptimal level of care on the other hand.

Not all interactions between the several systems and between the micro and the macro level are possible. A closed end system at the macrolevel, on the one hand, can be achieved, both by means of a fixed and a variable reimbursement system at the microlevel. A closed end system further requires prospective funding and is not compatible with retrospective reimbursement.

An open-ended system at the macro level, on the other hand, is not compatible with fixed reimbursement at the microlevel – but only with variable payment systems. Open ended

systems can work both with prospective and retrospective reimbursement. Each of the possible combinations has its advantages and disadvantages. Figure 5.1 shows that, at the microlevel, fixed payment systems are not compatible with retrospective reimbursement (but only with prospective reimbursement). Variable payment systems can be applied both in retro- and in prospective ways. A summary of the possible combinations and their main financial incentives is presented in Figure 5.2.

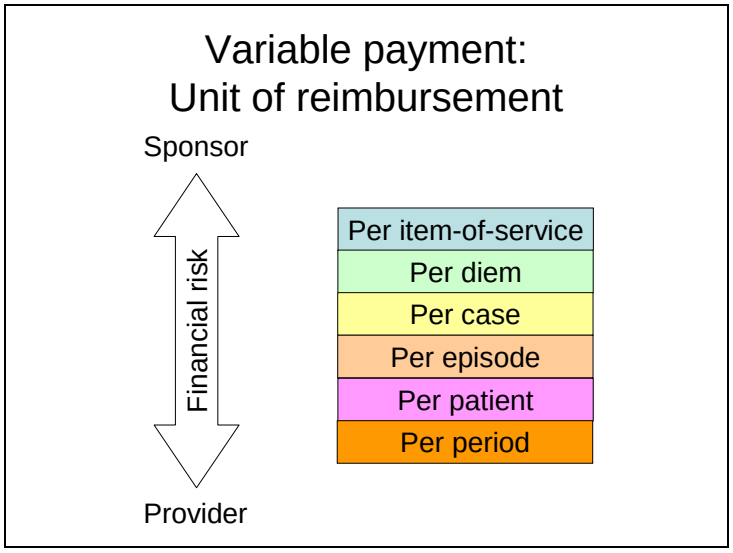
Figure 5.2: A summary of characteristics and incentives (assuming profit maximisation) in payment systems according to the retrospective/prospective and variable/fixed dimensions.



Source: Jegers, Kesteloot, et al. – 2002 [123]

Variable reimbursement systems for health care providers can further be classified according to the unit of financing (Figure 5.3).

Figure 5.3: Variable payment : Unit of reimbursement

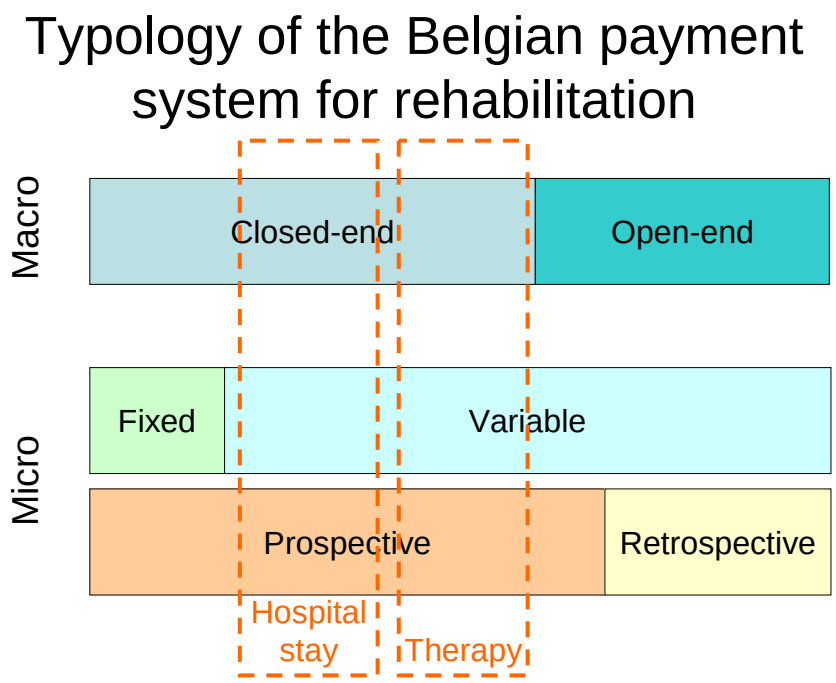


The unit used, e.g. item-of-service, diem, case, episode, patient or period indicates the intensity of the link between the provider's production costs and his return. The financial risk varies per unit of financing. As the 'unit' of payment becomes more extensive (i.e. covers a broader set of health care activities), the financial risk for the provider increases, to the advantage of the sponsor, whose financial risk decreases.

5.1.2 Financing of rehabilitation in Belgium

Financing of musculoskeletal and neurological rehabilitation in Belgium is split up in services related to a hospital stay (a small part for therapists payment is included) and rehabilitation activities (nomenclature and conventions). Each part has its own typology of payment systems (Figure 5.4).

Figure 5.4: Typology of the Belgian payment system for rehabilitation



5.1.2.1 *Hospital stay*

In Belgium the payment of services related to a hospital stay is done via a hospital funding system, which can be classified as a closed-end budget with a 'hard cap' at the governmental level. For the description of the coverage by the hospital day price we refer to "De Belgische ziekenhuisfinanciering ontcijferd. Walter Sermeus. ISBN 90-334-5277-4". There is no link between the price and the real costs related to the delivered services during a hospital stay. Hence, funding of the stay component in Belgian hospitals can, at the microlevel, be classified as a prospective, variable payment system.

The main parts in the hospital day price are B1 (financing of general services) and B2 (financing of clinical services), which represent 85% of the budget. For acute services B1 is yearly calculated related to units of work and B2 is yearly calculated related to justified activity.

For organisations providing musculoskeletal and neurological rehabilitation a specific system exists (Specialized or Sp-beds) where B1 and B2 are not recalculated every year, but set at their historical price level, annually adjusted for inflation. Historical prices depend on the history of the beds in these organisations. [1] Within the group of Sp-beds it concerns S2 beds for hospital stays during specialised musculoskeletal rehabilitation and S3 beds for specialised neurological rehabilitation. These beds can issue from beds for chronic care (V bed), for psychogeriatric care (Vp bed), for specialised rehabilitation (S bed), for surgical interventions (C bed), for acute medical services (D bed) or for the treatment of multiple sclerosis and its consequences (H bed). The historical price is higher for acute (C and D) beds than for V and S beds.

The budget to which an Sp-service or hospital is entitled is calculated, based on the historical price levels (cf. supra) and on the number of stay days in 2000 and the quotum

[1] Source: Koen Schoonjans Federal Governmental Service for Health Care

(expected number of stay days, based on a hypothetical occupancy rate of the beds) of 2002. [m]

If the actual number of stay days in year t for instance is lower *(higher)* than the quotum in 2002, the budget for year t is reduced with the B1+B2-part of the budget for the (non-realised) stay days below quotum *(increased with 25% of the B1+B2 part of the budget for each stay day on top of the reference number)*.

Moreover, the budget is paid to the institution, based on two parameters:

- monthly 'advance payments' (this method is used for 80% of B1+B2)
- a payment per stay day (this method is used for 20% of B1+ B2 and for all other parts of the budget). The price paid per stay day for year t is calculated on the basis of the actual number of stay days in t-2. Hence if the actual number of stay days in year t is larger (smaller) than the actual number of stay days in t-2, the institution will receive a (slightly) larger (smaller) budget than expected.

Hence, it can be concluded that, at the microlevel, also the hospital budget for Sp-services is prospective (i.e. not based on the actual costs of the institution) and slightly variable (i.e. small annual variations, depending on the evolution of the number of stay days, relative to the number of stay days in the reference period).

These beds are financed on a 7/7 days basis. Part-time hospitalisation (e.g. 5/7 days) is not provided within the system. This is contradictory as one of the main rehabilitation goals is reintegration in the home environment and patients should be encouraged to spend the weekends home as soon as possible. A funding system of "week day" hospitalisation is not applicable in Belgium – but inspiration may be found in the funding for partial hospitalisation in psychiatric hospitals (funding for day- or night hospitalisation in acute psychiatry (Ad, An), chronic psychiatry (Td, Tn) or child psychiatry (Kd, Kn), whereby the funding is based on an expected utilisation of the 'partial hospital beds' during weekdays (i.e. expected occupancy of 80% of the capacity during 251 days per year – or 56% per year).[n] Neither is there reimbursement for travel expenses to go home in the weekend (see further: transport convention). On the other hand there are no clearly defined criteria justifying hospitalisation.

As demonstrated during the Pathos-Aggir-Socios project, coordinated by Prof. M-C Closon in 2003-2005 ("Spécificités des services Sp/Specifieke aspecten van de Sp diensten"), there is a large variability in characteristics of patients staying in organisations providing musculoskeletal or neurological rehabilitation services at the level of:

- Independence
- Rehabilitation needs
- Age
- Number of pathologies and the interaction

The current Minimal Clinical Data (MKG/RMS) registration includes a registration of main pathology (principal diagnosis), degree of severity, main co-morbidities, principal interventions and some other data but does not provide enough information to map the variability at all mentioned levels. However, this variability influences the intensity of care and indirectly the financial needs. [o]

Summarised, financing of services related to a hospital stay is characterised by:

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[m] In this section, the overall characteristics of the Sp-hospital funding system are described. No details are added and the specifics of an acute hospitals with an Sp-service (whereby patients may have part of their stay in an Sp-unit and part of their stay elsewhere in the hospital) are not incorporated either.

[n] This funding system for partial hospitalisations is not automatically transferable to Sp-beds, since it covers daytime or nighttime hospitalisations (i.e. patients do not stay overnight or only overnight), whereas patients in Sp-beds do stay overnight (during weekdays). But it is a precedent of a hospital funding system, based on a 5/7 days per week hospitalisation.

[o] Analyse de la spécificité des services Sp. Rapport Mars 2003. D. Thimus, M.C. Closon

- A large variability mainly explained by historical factors
- A yearly price correction limited to the price index;
- Absence of a link with "working units" or "justified activity"
- Absence of a link with the large variability of patient characteristics.

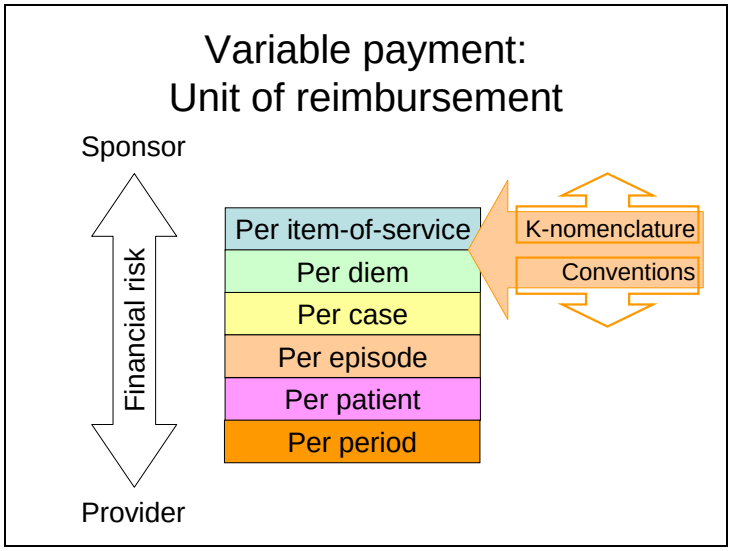
5.1.2.2 Rehabilitation activities

The payment of rehabilitation activities varies as a function of provider activities within an a priori defined budget. The budget can be exceeded but in case of a significant overrun, corrective measures – such as an adjustment in the fee schedule or an increase in co-payment – can be undertaken. There is no link between the price and the real cost of therapy (prospective payment).

Rehabilitation activities are financed by two different systems: nomenclature and conventions. Nomenclature covers mono-disciplinary as well as multidisciplinary activities (R for mono-disciplinary speech therapy, M for mono-disciplinary physical therapy and K for physical medicine & rehabilitation). The systems for multidisciplinary rehabilitation activities, scope of this study, will be analysed in detail in the following paragraphs (K-nomenclature and conventions).

There are no significant differences between the nomenclature and the conventions, nor from a financial point of view, nor concerning accessibility, content, intensity or duration of therapy (Figure 5.5).

Figure 5.5: Variable payment: Unit of reimbursement



The unit of reimbursement is per item-of-service for both systems. However, the unit of reimbursement is for some cases within the conventions rather per diem because the item-of-service is a 6 hours therapy session, while the item-of-service within the K-nomenclature is limited to a 1 or a 2 hours therapy session.

The beneficiary of the budget differs. For K-nomenclature the physiatrist is the paid provider whereas for conventions the paid provider is the institution. However, the received budget must in both cases be distributed over physiatrist, therapists and institution.

The type of beneficiary has an impact on:

- The position of the physiatrist in the discussion concerning distribution of the budget

- The relation between physiatrist and therapists
- The relation between physiatrist and patients
- The guarantees for optimal supply of care to the patients.

Financing of rehabilitation activities is characterised by two different payment systems which differ little concerning the type of financed rehabilitation activity (both multidisciplinary for nearly the same diagnoses), or the unit of payment. The price as well as the paid provider differ.

Due to a differentiation of rehabilitation organisations in function of the access to different payment systems, the income of rehabilitation organisations, the distribution of responsibilities and positions of authorities within these organisations differ without a formal link to delivered rehabilitation services.

The current double payment system appears irrational. The concern is that different payment systems are applied while patients in one setting of care may, in some instances, be similar to patients in other settings of care.

5.1.3 Payment systems for musculoskeletal and neurological rehabilitation activities

As mentioned above, two main systems exist for (multidisciplinary) musculoskeletal and neurological rehabilitation:

- Hospital day price of Sp-beds: S2 musculoskeletal and S3 neurological (inpatients only)
- Rehabilitation activities (in- as well as outpatients):
  - Rehabilitation agreements ("conventions") between the RIZIV/INAMI and the health care provider .
  - Nomenclature of Physical Medicine & Rehabilitation (a fee schedule: "K")

There is a substantial overlap between the different systems and it is not always clear which system should be used. The two systems (nomenclature and conventions) for rehabilitation activities could even be used sequentially for a certain number of pathologies until very recently (rules changed August 1st 2006, as will be explained in chapter 5.1.5).

Nomenclature acts are physician's fees whereas conventions are agreements between RIZIV/INAMI (Insurance committee) and the health care providers (institutions). Hospital day prices are also paid to the hospitals (except for the "fee for supervision" which is again a fee for the physician).

In order to understand the existence of the different payment systems in Belgium, a short historical review seems necessary. In 1963 the National Institute of Sickness and Invalidity Insurance (RIZIV/INAMI) was founded by the Ministry of Social Affairs, as well as the "Rijksfonds voor Sociale Reclassering van de Mindervaliden" or "Fonds Maron" (further called "National Fund") by the Ministry of Employment and Work. Most aspects of rehabilitation resorted under the "National Fund" and the main objective was to promote employment of persons with a disability. Therefore the maximum age for subscription was set at 65 years.

Due to the changing governmental structure of Belgium, the "National Fund" was abolished in 1991 and replaced by four different Regional Funds (VFSIPH, AWIPH, COCOF, Dienststelle der Deutschsprachigen Gemeinschaft für Personen mit einer Behinderung sowie für die besondere soziale Fürsorge. Note that since April 2006 the VFSIPH (Vlaams Fonds voor Sociale Integratie van Personen met een Handicap) is called VAPH (Vlaams Agentschap voor Personen met een Handicap)). These funds are responsible for accreditation and subsidies of the Rehabilitation centres. In 1995 though, the subsidies for the intramural (in a hospital) rehabilitation centres were abolished by the Flemish Fund (VFSIPH). On the other hand these funds finance measures promoting social and/or professional integration of disabled persons, as well as individual material or

personal assistance. Whereas the national fund organised quality control through inspection visits of the centres, this is no longer organised by the regional funds.

Rehabilitation services are since 1991 financed by the RIZIV/INAMI. Rehabilitation is part of the health care provisions system (art.34 of the law concerning compulsory health insurance) which is mainly a fee for service system.

Most of the rehabilitation agreements have been established on a temporary basis in 1991 and since then been prolonged year by year. For musculoskeletal and neurological rehabilitation, the subject of this study, there are different types of agreements: 46 "type conventions 950" (28 in the region of Flanders, 13 in Wallonia and 5 in Brussels) and 7 "specific conventions 7.71" (2 in Flanders, 3 in Wallonia and 2 in Brussels). There are also agreements with six reference centres for neuromuscular diseases (NMRC-convention) 7.89.2 (3 in Flanders, 1 in Wallonia and 2 in Brussels). Recently, reference centres for cerebral palsy and spina bifida as well as for chronic fatigue and chronic pain were introduced as well.

In the nomenclature (a fee schedule) of Physical Medicine & Rehabilitation (art. 22 and 23 "Physiotherapy") three nomenclature codes for rehabilitation acts were established in 1991, and have been revised in August 2004. Since then the nomenclature includes more specific criteria and a limitative list of pathologies. However, there is a great overlap between these pathologies and those included in the agreements.

The nomenclature, as well as the 9.50 and 7.71 conventions, can be applied in both hospitalised and ambulatory patients.

Rehabilitation for hospitalised patients is mostly organised in a day-price system of specialized beds (Sp beds, musculoskeletal and neurological). Accreditation of hospital beds is organized by the Ministry of Public Health. Again, both systems can be used simultaneously (Sp bed/nomenclature or Sp bed/agreement). These beds exist since the early nineties and the norms were published in 1993. The "day-price" also covers some therapists and infrastructure for rehabilitation. Their historical background can be very different. Many of them, mainly the beds in isolated services (also called "categoral" hospitals), originated from the formal R- or V-beds (hospital law 1985). Others are reconverted acute beds (C- or D-beds) in general hospitals. The financing is depending on the formal day-price of the original bed-type (acute or chronic, general or "categoral" hospital) and varies substantially. The day-prices are mainly set historically and there are no objective criteria to differentiate between them. The last decade we saw a spectacular growth of the number of Sp-beds. For instance, the number of S2 beds (Sp beds for "musculoskeletal" disorders) increased between 2003 and 2005 from 1.775 to 1.996.

5.1.3.1 Conventions

Within the convention system, the following conventions are relevant for musculoskeletal and neurological rehabilitation.

- "Convention 7.71: Specific and type conventions – Institutions for motor rehabilitation": these conventions exist under two distinct forms (described as such in the "Riziv Audit Revalidatiesector June 2004"):
  - "Specific reference centres for important orthopaedic and/or neurological rehabilitation". These reference centres provide rehabilitation to patients with highly complex disorders and provide treatments of at least half a day.
  - "Specific categoral centres": category specific rehabilitation centres specialised in one pathology such as multiple sclerosis or traumatic brain injury.
- "Convention 9.50: Type convention – Institutions for 'locomotor' rehabilitation": 48 (since 2005 only 46) general rehabilitation centres located across the different regions. The 9.50 centres provide rehabilitation to patients with complex disorders or more important impairments and disabilities and lasting problems. This convention

was renewed in a different form July 1st 2005 (and is applied since August 1st 2006) .

- "Convention 7.89.2: Type convention - Reference centres for patients with neuromuscular disorders". This type of convention is different from the 9.50 and 7.71 in the sense that the fee covers the coordination and follow-up of the services provided to these patients during one year
- Additionally, for wheelchair bound patients there exists a "transport-convention" in order to pay for the travelling expenses for ambulatory rehabilitation.

To be complete the following conventions have to be mentioned:

- "Convention 7.89.4: Reference centres for chronic fatigue syndrome."
- "Convention 7.89.5: Reference centres for cerebral palsy and spina bifida (CP-SB)".
- "Convention 7.89.6: Reference centres for chronic pain."

As these conventions have been applied only since very recently we did not perform any analyses on the data. In concept they are very similar to the convention 7.89.2.

Based on the scope of this study, a detailed analysis is performed on the 9.50 convention (paragraph 5.1.4), the 7.71 convention (paragraph 5.1.5) and to a lesser extent the convention 7.89.2 (paragraph 5.1.7).

5.1.3.2 Nomenclature

Within the nomenclature system, three nationally established fee schedules are relevant for musculoskeletal and neurological rehabilitation:

- K-nomenclature: nomenclature for Physical Medicine and Rehabilitation (PM&R): applied in the departments for PM&R, present in most of the Belgian hospitals, where a team of multi-disciplinary practitioners provide general and acute rehabilitation, under the supervision and coordination of a specialist in PM&R
- M-nomenclature: nomenclature for mono-disciplinary physical therapy
- R-nomenclature: nomenclature for mono-disciplinary speech therapy (to be distinguished from R30/R60 applied for convention 9.50. There is no relation between the two R-codes.).

For other disciplines such as occupational therapy and psychotherapy there currently is no nomenclature when performed mono-disciplinary.

Based on the scope of this study, a detailed analysis is performed on the K nomenclature (paragraph 5.1.6).

5.1.3.3 Hospital day price

Regarding the fee for hospitalisation the assumption is that most of the inpatients reside in Sp-beds: S2 beds (allocated for musculoskeletal disorders) and S3 beds (allocated for neurological disorders).

As rehabilitation activities for inpatients also take place in other settings (geriatric beds, Sp-beds for chronic disorders, acute beds, psychiatric beds…) the expenses for S2 an S3 beds are probably an underestimation of the "fee for hospitalisation for musculoskeletal and neurological rehabilitation".

5.1.3.4 Other payment systems

In addition to the financial arrangements for the different rehabilitation modalities, some centres can benefit from other sources of income such as subsidies from the Regional Funds (VFSIPH, AWIPH,…) and Institutions (VIPA, CRAC, COCOM), for example for buildings.

VIPA (Vlaams Infrastructuurfonds voor Persoonsgebonden Aangelegenheden): Flemish public institution. As a financing instrument VIPA provides financial support to welfare and health provisions for infrastructural works in e.g. hospitals and elderly care institutions in Flanders.

CRAC (Centre régional d'aide aux communes): Walloon public institution that supervises financial issues of the municipalities and the hospitals in Wallonia.

COCOM (Commission communautaire commune): public institution of the region of Brussels-capital, responsible for health policy and health institutions.

Moreover, specific products and materials (e.g. pharmaceuticals, devices,…) can be reimbursed separately, both for hospitalised and for ambulatory patients.

5.1.3.5 Sources of data

All data concerning the different systems (descriptions and expenditures) were supplied by the RIZIV/INAMI (National Institute of sickness and invalidity insurance) and the FOD Volksgezondheid (Federal Service of Health, Food Chain Safety and Environment Organisation of Health Care Establishments).

5.1.4 Inventory of different rehabilitation services

5.1.4.1 Departments of Physical Medicine and Rehabilitation

Surprisingly there exists no central register of the departments of physical medicine and rehabilitation. It is presumed that most of the acute/general hospitals in Belgium dispose of such a department.

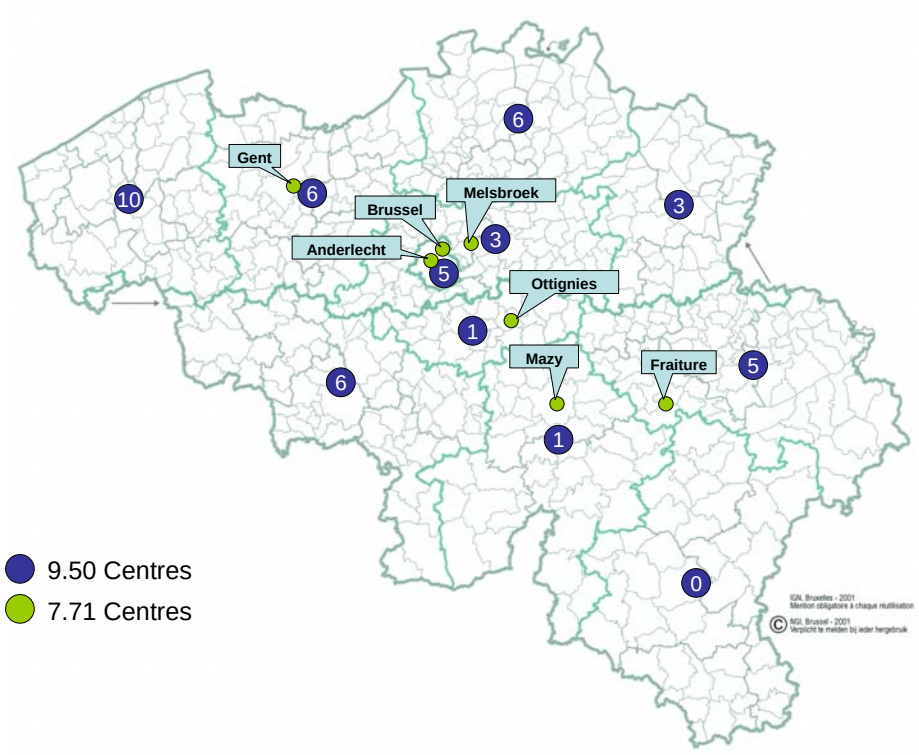
5.1.4.2 Rehabilitation centres with a convention (9.50 or 7.71)

In Figure 5.6 an overview is given of the geographical distribution of the 46 rehabilitation centres with a 9.50 convention and the 7 rehabilitation centres with a 7.71 convention mentioning:

- the number of 9.50 centres in each of the 10 Belgian provinces and the Brussels region
- the different locations of the 7.71 centres

This inventory is based on data from RIZIV/INAMI.

Figure 5.6: Geographical location of the 9.50 and 7.71 centres (2006)



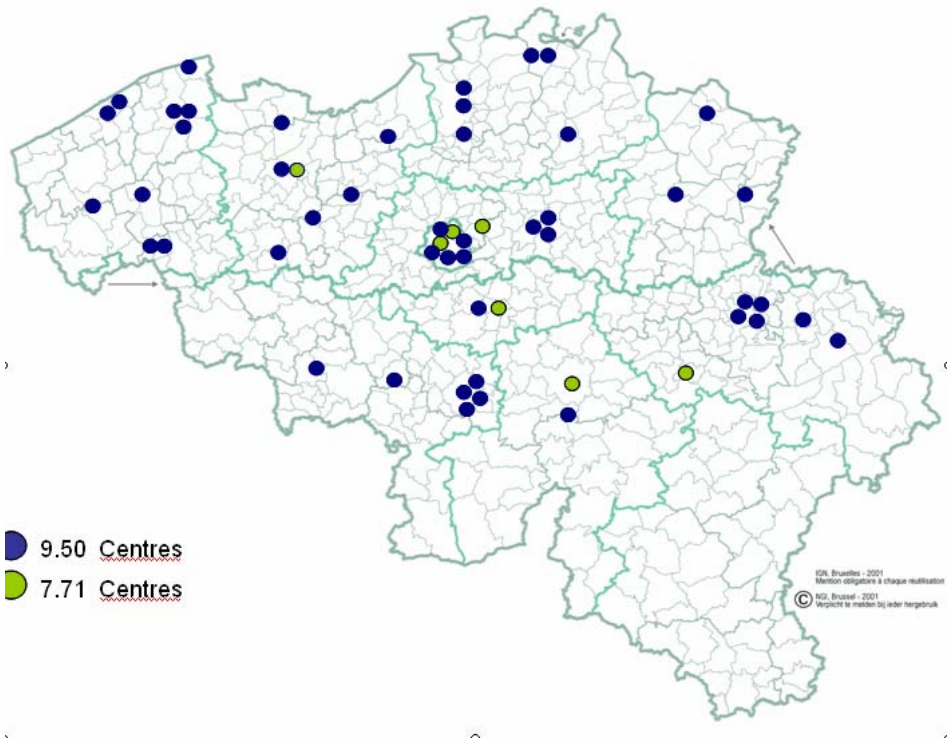


Figure 5.7 shows population data for the 10 provinces and the Brussels region, as well as the concentration of conventioned centres per province.

Figure 5.7: Population data (Belgium provinces and Brussels region) and number of 9.50 and 7.71 conventions/100 000 inhabitants

Provinces	Number of 9.50 conventions	Number of 7.71 conventions	Population	Population / km²	Number of 9.50-7.71 conventions / 100.000 Inabitants
West Vlaanderen	10	0	1.138.503	364	0,88
Oost Vlaanderen	6	1	1.380.072	463	0,51
Vlaams Brabant	3	1	1.037.786	493	0,39
Antwerpen	6	0	1.676.858	585	0,36
Limburg	3	0	809.942	334	0,37
Brabant Wallon	1	1	363.776	333	0,55
Hainaut	6	0	1.286.275	340	0,47
Liège	5	1	1.034.024	268	0,58
Luxembourg	0	0	256.004	58	0,00
Namur	1	1	455.863	124	0,44
Brussels Hoofdstedelijk gewest - Région de Bruxelles- Capitale					
Brussels Hoofdstedelijk gewest	5	2	1.006.749	6238	0,70
Totals	**46**	**7**	**10.445.852**	**342**	**0,51**

Source: Nationaal Instituut voor de Statistiek – 2005

The "absolute" number of 9.50 / 7.71 conventions as an indicator for rehabilitation activity has some limitations because:

- Some of the 9.50 conventions might not be in use and represent no rehabilitation activities.
- The number of institutions with a 9.50 convention is not proportional to the number of musculoskeletal and neurological rehabilitation activities. The volume (number) of rehabilitation activities depends on the capacity of the institution (for inpatients and outpatients).

In the distribution of centres over the country different factors can be of importance such as:

- Geographical distribution (distance)
- Transport issues such as public transportation facilities, traffic density (traffic jams)
- Density of population (in order to obtain a minimum volume of patients/activities per centre)
- Language issues

Nevertheless, the following conclusions can be drawn

- There are no institutions with a 9.50 or 7.71 convention in the province of Luxembourg. As a consequence, inhabitants of Luxembourg need to travel to the neighbouring provinces. Luxembourg is characterized by the lowest number of inhabitants, the biggest area in km², resulting in the lowest population density (58 inhabitants / km²).
- In the Walloon region, provinces with the lowest number of inhabitants (Namur, Luxembourg, Brabant wallon) do have the lowest number of rehabilitation centres with a 9.50 and/or 7.71 conventions. These institutions are concentrated in the provinces of Liège and Hainaut, which have the highest number of inhabitants.
- In the Flemish region, West Flanders has a significantly higher number of 9.50 conventions, as compared with the other provinces.
- The Brussels region has a high number of 9.50/7.71 conventions per 100 000 inhabitants whereas it is characterised by a very high density of 6312 inhabitants / km².
- On the whole, 9.50 and 7.71 conventions considered together, they are rather homogeneously distributed compared to the density of population in a certain area. There are two exceptions: Luxembourg has no conventions at all, whereas West-Vlaanderen has a high number of 9.50 conventions. It should be taken into consideration however, that the number of conventions is not necessarily proportional to the number of musculoskeletal or neurological rehabilitation activities since their capacity can differ.

5.1.4.3 Inventory of Sp Beds

In order to have a more precise view on rehabilitation activities, compared with the number of 9.50 conventions and/ or 7.71 conventions, we give an overview of the number of beds, which are allocated to musculoskeletal and neurological rehabilitation.

Based on the scope of the study, the inventory is limited to S2 and S3 beds.

- S2 beds are defined as beds for the treatment and rehabilitation of "musculoskeletal" disorders.

- S3 beds are defined as beds for the treatment and rehabilitation of "neurological" disorders.

Practically, there is some overlap between both bed-types for an important number of disorders that have "neurological" as well as "musculoskeletal" aspects. For instance, a patient with a stroke, MS or a spinal cord lesion can be admitted in a S2 as well as in a S3 unit. However, patients without a neurological disorder such as amputees or patients with THR (total hip replacement) will only stay in S2 beds.

Limitations of this approach are:

- Focus lies on rehabilitation activities for inpatients, as the number of S2 and S3 beds gives an indication of rehabilitation activities in a hospital setting.
- Musculoskeletal and neurological rehabilitation activities are also given to patients who are hospitalized in other beds such as G (geriatric) beds, S5 beds (beds for chronic disorders), K beds (neuropsychiatry for children), C beds (surgery), D (internal medicine), …

As a consequence, an inventory of S2 and S3 beds, as an indicator for musculoskeletal and neurological rehabilitation in hospital setting might be an underestimation of the real activity. On the other hand, due to waiting lists for instance in nursing-homes, some patients stay longer than necessary in the Sp-bed.

5.1.4.4 Results

As shown in Figure 5.8 there are currently 3321 S2 and S3 beds in Belgium. The S2 beds, allocated for rehabilitation of musculoskeletal disorders represent 60 %, the S3 beds for neurological disorders 40 %.

Figure 5.8: General overview of S2 and S3 beds

	S2	S3	S2 + S3
Flemish region	1069	702	1771
Walloon region	672	437	1109
Brussels region	278	163	441
Total	2019	1302	3321

Source[P]: https://portal.health.fgov.be – updated 29-05-2006

[P] There are two different databases for the inventory of S2/S3 beds. The first database gives an overview of the total number of beds at a certain point in time (e.g. figure 4), the second source calculates a year-to-date average of the total number of beds and takes into account the variation per institution in this given year (e.g. figure 30). These databases diverge for the indicator "total number of beds" given their different calculation.

Figure 5.9 shows the geographical distribution of the S2 and S3 beds over the 10 provinces and the Brussels region.

Figure 5.9: Geographical repartition of S2 and S3 beds in Belgium

	West Vlaanderen			Oost Vlaanderen			Vlaams Brabant			Antwerpen			Limburg			Brabant Wallon			Hainaut			Liège			Luxembourg			Namur			Brussels		
Number Beds / institution	S2	S3	Total	S2	S3	Total	S2	S3	Total	S2	S3	Total	S2	S3	Total	S2	S3	Total	S2	S3	Total	S2	S3	Total	S2	S3	Total	S2	S3	Total	S2	S3	Tota
Institution 1	20	20	40	26	27	53	59	20	79	26	60	86	20	20	40	56	27	83	20	21	41	20	31	51	20		20	24	20	44	20	55	75
Institution 2	30	25	55	20	23	43	30	123	153	60	20	80	20	120	140	42		42	24	20	44	20	56	76	32		32	26		26	24	88	112
Institution 3	20	50	70	20		20	30	134	164	55	40	95	30		30				26	20	46	31	30	61	30		30	20		20	29	20	49
Institution 4	20	20	40	24		24	20		20	100		100	22		22				24	81	105	20	100	120							22		22
Institution 5	22		22	30		30				26		26	20		20				20	9	29	20		20							24		24
Institution 6	60		60	20		20				20		20							20	22	42	30		30							20		20
Institution 7	125		125							22		22							40		40	20		20							47		47
Institution 8	20		20							30		30							21		21	20		20							38		38
Institution 9										22		22							24		24										30		30
Institution 10												0							22		22										24		24
Totals	**317**	**115**	**432**	**140**	**50**	**190**	**139**	**277**	**416**	**361**	**120**	**481**	**112**	**140**	**252**	**98**	**27**	**125**	**241**	**173**	**414**	**181**	**217**	**398**	**82**	**0**	**82**	**70**	**20**	**90**	**278**	**163**	**441**
Population	1.141.866			1.389.450			1.044.133			1.688.493			814.658			366.481			1.290.079			1.036.588			258.547			458.574			1.018.804		
(Number Beds / inhabitants) * 100.000	27,8	10,1	37,8	10,1	3,6	13,7	13,3	26,5	39,8	21,4	7,1	28,5	13,7	17,2	30,9	26,7	7,4	34,1	18,7	13,4	32,1	17,5	20,9	38,4	31,7	0,0	31,7	15,3	4,4	19,6	27,3	16,0	43,

Source: **https://portal.health.fgov.be** – updated 29-05-2006

The following information is included in the table:

- Number of S2 and S3 beds in every province and the Brussels region – taking into account the repartition of these beds over several institutions. For example: In West-Vlaanderen there are 317 S2 beds and 115 S3 beds. The 317 S2 beds are spread over 8 institutions. The 115 S3 beds are spread over 4 institutions
- Population (number of inhabitants) of every province and the Brussels region
- Ratio Number of beds / 100.000 inhabitants. For example: in West-Vlaanderen there are 27.8 S2 beds / 100.000 inhabitants and 10.1 S3 beds / 100 000 inhabitants.

Remarks:

- The number of S2 and S3 beds does not always represent general rehabilitation capacity because some centres are focusing on one specific pathology. For example the 134 S3 beds in Vlaams-Brabant are mainly for multiple sclerosis patients and do not represent general neurological rehabilitation.
- The differentiation between "musculoskeletal" and "neurological" is not always very clear. Many neurological patients also present musculoskeletal problems. For example stroke patients can also be admitted in musculoskeletal beds.
- Rehabilitation activities for inpatients are not only linked to S2 and S3 beds. Many musculoskeletal and neurological rehabilitation activities take place in G (geriatric) beds, K (neuropsychiatry beds for children) beds, S5 (bed for chronic diseases), C (surgical beds), D (internal medicine beds), ….

Nevertheless, the following conclusions can be drawn:

- The number of institutions with S2 beds is higher than the number of institutions with S3 beds. As a consequence geographical coverage is higher for musculoskeletal rehabilitation than for neurological rehabilitation (average distance to a S2 centre is smaller than the average distance to a S3 centre for the patients). This remark is applicable on all the provinces and the Brussels region. This seems logical though as most of the neurological disorders can also be treated in musculoskeletal beds.
- At the national level there are 19 S2 beds / 100 000 inhabitants and 12.4 S3 beds / 100 000 inhabitants meaning that musculoskeletal rehabilitation is more important in terms of infrastructure (beds) than neurological rehabilitation.
    - The ratio "number of S2 beds / 100 000 inhabitants" varies from 10,1 in Oost-Vlaanderen to 31.7 in Luxembourg.
    - The ratio "number of S3 beds / 100.000 inhabitants" varies from 0 in Luxembourg to 26.5 in Vlaams-Brabant
- In Wallonia, the two provinces with the highest number of inhabitants (Liège and Hainaut) are characterized by a medium ratio of "number of S2 beds/100 000 inhabitants" and a high ratio "number of S3 beds/100 000 inhabitants".
    - The ratio "number of S2 beds/100 000 inhabitants is 18.7 in Hainaut and 17.5 in Liège (national average 19.2)
    - The ratio "number of S3 beds / 100 000 inhabitants is 13.4 in Hainaut and 20.9 in Liège (national average 12.4)

Based on this information, it seems that neurological rehabilitation in the Walloon region is concentrated in the provinces Liège and Hainaut..

- In Wallonia, the three provinces with the lowest number of inhabitants (Namur, Luxembourg, Brabant wallon) are characterized by a low ratio concerning "number of S3 beds/100 0000 inhabitants"
    - The ratio "number of S3 beds/100 000 inhabitants is 4.4 in Namur, 0 in Luxembourg and 7.4 in Brabant wallon (national average 12.4)
    - The ratio "total number S2 + S3 beds/100 000 inhabitants" is only low in Namur.

Combining this information with the results of the previous paragraph (number of 9.50 and 7.71 conventions) we conclude that

- The low number of 9.50 and 7.71 conventions in Luxembourg does not correlate with the infrastructure of S2 beds (musculoskeletal rehabilitation).
- The low number of 9.50 and 7.71 conventions and the low ratio of S3 beds/100 000 inhabitants confirms the concentration of neurological rehabilitation in the other provinces Liège and Hainaut. Especially in Luxembourg and Namur, that cover a much larger area than Brabant wallon, it might be a long distance to travel to obtain appropriate neurological rehabilitation.

- In Flanders all provinces (except Oost-Vlaanderen) are characterized with one ratio above and one ratio below the national average (S2 or S3 beds/10 000 inhabitants).
    - Oost-Vlaanderen is characterized by a ratio of 10.1 S2 beds/100 000 inhabitants and 3.6 S3 beds / 100.000 inhabitants. Both indicators are below the national average. Based on the information of the previous paragraph (six 9.50 conventions and one 7.71 convention), we did not expect this result. A partial explanation is the fact that only 20 beds of the rehabilitation centre of the University hospital of Ghent are included in the overview as S2 beds.

Combining this information with the results of the previous paragraph (number of 9.50 and 7.71 conventions) we conclude that

- "West-Vlaanderen, that was characterised by a high number of 9.50/7.71 conventions, has an S2 ratio of 27.8 which is above the national average of 19 and a S3 ratio below the national average of 12.4.
- Oost-Vlaanderen has a low ratio total number S2 + S3 beds/100 000 inhabitants but an average number of 9.50 and 7.71 conventions.

- In the Brussels region, the ratio number of S2 beds/100 000 inhabitants is 27.3 and the ratio number of S3 beds / 100 000 inhabitants is 16. Both ratios are above the national average. Combining this information with the results of the previous paragraph (number of 9.50 conventions/7.71 conventions) we conclude that both musculoskeletal and neurological rehabilitation beds are abundantly represented in the Brussels region.

5.1.4.5 Conclusion

The geographical distribution of 9.50 and 7.71 conventions and S2-S3 beds is relatively homogeneous in Belgium. Only the provinces of Luxembourg and Namur tend to show a relatively low supply of neurological rehabilitation services, whereas there is a relatively high supply of rehabilitation services in the Brussels region and West-Vlaanderen.

5.1.5 Convention 9.50: Type convention – Institutions for 'locomotor' rehabilitation

5.1.5.1 Cost model 9.50 convention

The cost of the rehabilitation activity, specified in the 9.50 convention is determined by the contract with RIZIV/INAMI and is equal for the 46 rehabilitation centres that subscribed to the 9.50 convention.

The focus lies on the "new" 9.50 agreement that should have been applied since July 1st 2005, but only started August 1st 2006 (KB 22-06-2006). All sessions in the 9.50 conventions have to be multidisciplinary (at least 2 disciplines), in contrast to K-nomenclature, which can also offer mono-disciplinary sessions.

In the "new 9.50 convention" two rehabilitation prices are applied:

- During the first 60/120 sessions (depending on the underlying pathology) a uniform price per rehabilitation session is paid. This is called R30/R60, where R30 stands for one hour and R60 for two hours of multidisciplinary rehabilitation activities (comparable to K30/60). The exact price is €30.58 for R30 and €61.15 for R60 (Oct. 2006) (comparable to the prices of K30/60, see further).
- After these 60/120 sessions, the price per session is in relation to the underlying pathology, without any relation with duration of the session.
- The accumulation of diagnostic with treatment honoraria or an accumulation of K-nomenclature with rehabilitation fees (9.50) is forbidden during the first 60/120 sessions (exception for speech therapy). After this first period one extra fee can be cumulated (e.g. M-nomenclature for physical therapy or R-nomenclature for speech therapy). Also, the "new 9.50 convention" cannot be preceded any more by K30/60, at least in the 46 existing 9.50 rehabilitation centres. Of course, centres without convention 9.50 can first apply K-nomenclature, and then refer the patient to a 9.50 convention centre. The convention-centre receiving such a patient has to discount the amount of K-sessions already delivered from the 60 or 120 sessions they can deliver using R30/R60. A problem with regard to referral between different services is that after R30/R60, K30/K60 cannot be applied anymore in services without a convention.

The price is subject to indexation.

5.1.5.2 Target groups 9.50 convention

Figure 5.10: Target groups convention 9.50

9.50
Group A2
- Acquired para or tetraplegia - Brain injury that causes severe neuromotor impairments or speech- and language impairments or other severe neuropsychological impairments
Group A2bis
- Chronic evolutive diseases of the brain and/or spinal cord, with motor or intellectual sequels, during the intensive rehabilitation phase after an episode of deterioration
Group A4
- Amputation of an upper or lower limb
Group B3
- Cerebral palsy - Congenital diseases of the spine and/or spinal cord - Dysmelia en phocomelia
Group B4
- Myopathies: progressive hereditary muscular dystrophies, Thomson's myotonia congenita and autoimmune polymyositis - Mucoviscidosis - Severe musculoskeletal and psychological impairments due to rheumatoid arthritis in a Steinbrocker stadium III and IV
Art. 5 paragraph 3
After the allowed maximal duration of a patient, there is a possibility to extend treatment with a more limited cost per treatment.

Source: RIZIV/INAMI 2006

In Figure 5.11 the different pathology groups are linked to:

- Maximum number of sessions (limited to one treatment per day)
- Number of extra sessions that are allowed after the maximum number of sessions are reached
- Maximum duration of the total rehabilitation program
- Price of the session (€) after R30/60
- Maximum duration of the treatment interval (if specified)

Figure 5.11: Target groups and treatment criteria (convention 9.50)

Pathology	Maximum number of sessions (one session / day)	Maximum duration of the total rehabilitation program	Extra sessions after maximum (art. 5)	Price of the session after R30/60 (€)	Maximum duration of interval
Groep A2	460 (max. 120 R30-R60)	2 year	150/year	39	
Groep A2 bis		every period of illness	150/year	39	3 months
Groep A4	195 (max. 60 R30-R60)	1 year		37	
Groep B3	230 (max. 120 R30-R60)	years 1 to 6	100/year	36	9 treatments of 6 months
				69	3 treatments of 6 months
	144/year	years 6 to 18	100/year	21	
Groep B4	30/maand (max. 120 R30-R60)	6 months	100/year	43	

Source: RIZIV/INAMI 2006

Remark: Group B3 has different reimbursements depending on type of treatment (not pathology).

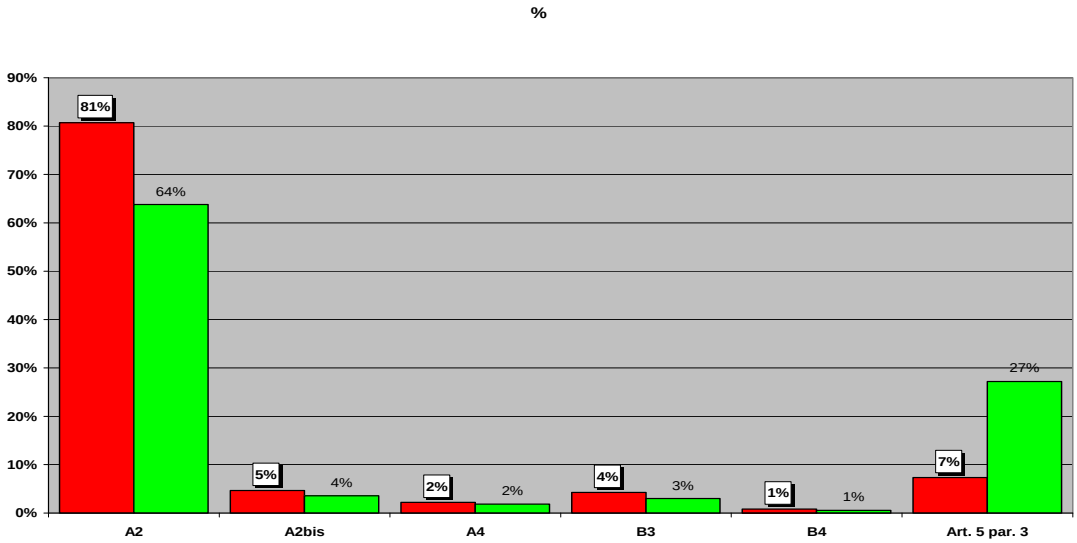
In the convention a maximum duration (time between the start date and end date of all treatment sessions) and a maximum number of sessions is specified for each pathology group.

All pathology groups except group A4 (amputation of an upper or lower limb) can be the subject of an extension of the normal duration time (see art. 5 paragraph 3) at a reduced price of €5,87.

Figure 5.12: Relative distribution of expenditures and number of treatments within the 9.50 convention per pathology

Red : percentage of expenditures Green : percentage of cases

Source: RIZIV / INAMI 2006



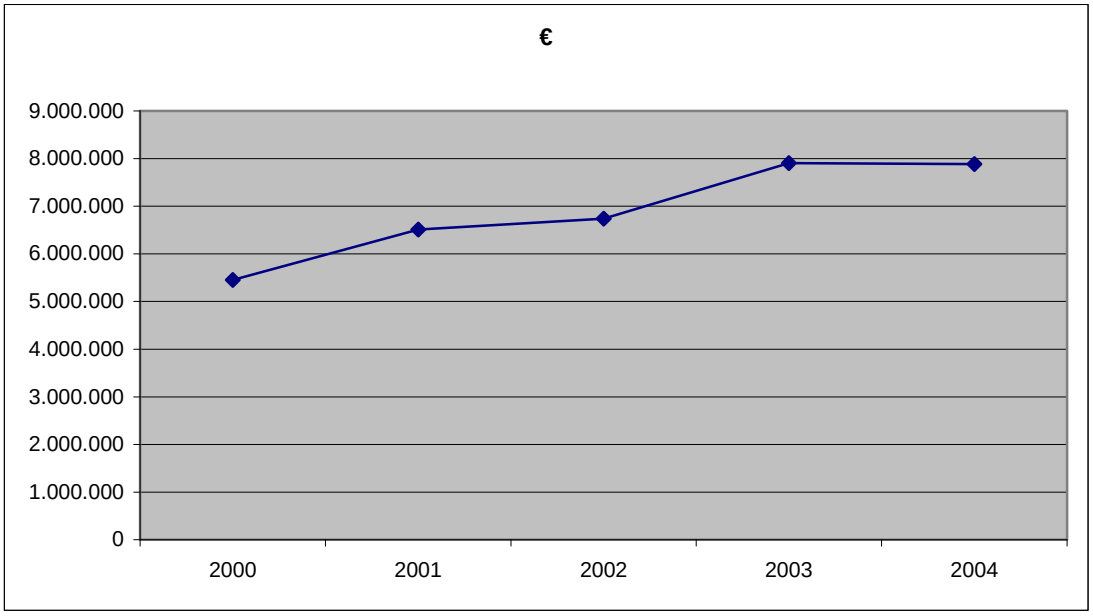
As shown in Figure 5.12 group A2 (acquired para- or tetraplegia , brain injury that causes severe neuromotor impairments or speech- and language impairments or other severe neuropsychological impairments) is the most important pathology group, representing 81 % of the expenditures and 64 % of the cases. The art. 5 par. 3 represents the extension of rehabilitation activities after the normal duration time at a reduced price of 5,87 €. This group represents 7% of the expenditures and 27 % of the cases. All other pathology groups represent a rather limited proportion of expenditures and cases. Note that these numbers relate to expenditures and cases before introduction of the above explained "new 9.50 convention".

5.1.5.3 Requirements

Team	
Management	Unspecified
Team	Physician in Rehabilitation Medicine Multi-disciplinary team (unspecified)
Experts	General practitioner Nurse Social worker
Infrastructure	
Opening hours	Unspecified
Volume	Unspecified

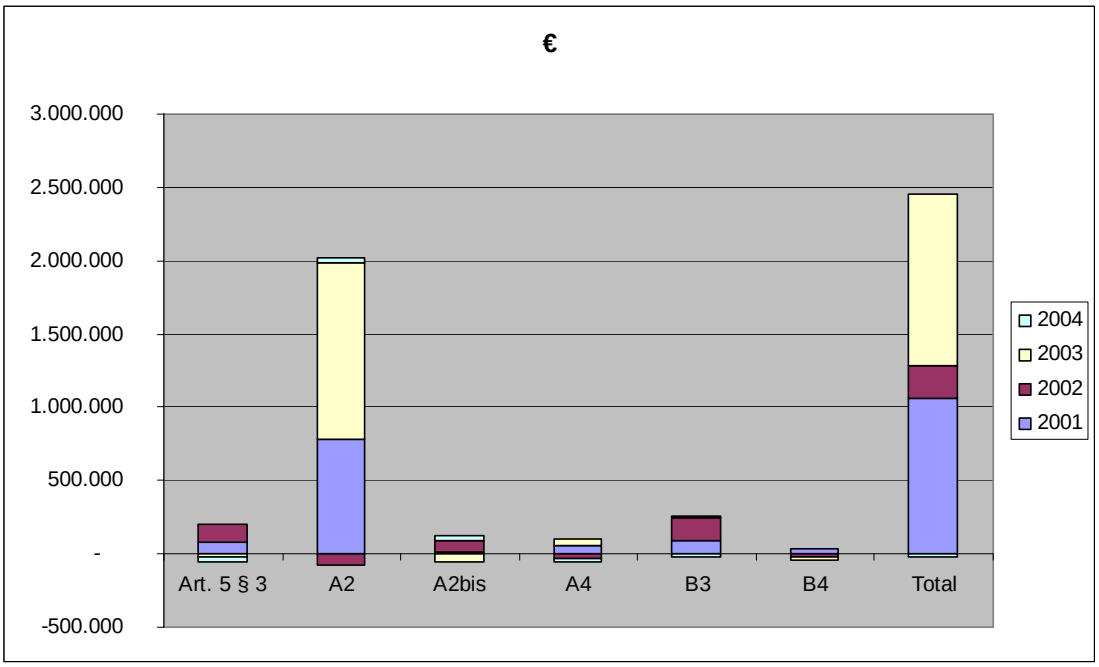
5.1.5.4 *Detailed overview expenditures evolution convention 9.50*

Figure 5.13: Expenditures evolution of the convention 9.50 between 2000 and 2004 in Euro.



Source: RIZIV/INAMI 2006

Figure 5.14: Detailed expenditures growth of the convention 9.50 between 2000 and 2004 in Euro.



Source: RIZIV/INAMI 2006

We notice that in absolute terms (€), A2 pathology (para- and tetraplegia/brain injury) is responsible for the largest part of the growth.

Other pathology groups have a rather marginal influence on the expenditures growth in the 9.50 conventions; they also represent a limited number of cases in the 9.50 convention.

5.1.5.5 Conclusion Convention 9.50

This convention can be applied in 46 Belgian rehabilitation organisations for a limited list of acute or chronic neurological and musculoskeletal disorders. The fee (per item-of-service) is different for a number of different groups of pathologies.

The largest group of patients, at least before the changes to the "new convention 9.50", is A2 pathology (para- and tetraplegia/brain injury). Possibly a lot of patients in this group are stroke patients, however, no further diagnostic details are available.

Art 5 par. 3 is registered frequently (27% of cases), which means that many patients are chronic patients. This is probably linked to the transport convention and the relatively important group of outpatients in the 9.50 conventions. In practice this rather small fee is often cumulated with mono-disciplinary K or M-nomenclature.

The system recently (August 2006) changed to the "new convention 9.50", so new evolutions are to be followed up.

5.1.6 Convention 7.71: Specific and type conventions – Institutions for motor rehabilitation

5.1.6.1 Cost models 7.71 conventions

The cost model analysis was done based on the different conventions 7.71 that exist between the RIZIV/INAMI and the seven 7.71 centres.

Two different convention models were identified for the 7.71 centres. Although a typology exists, each centre has an individual agreement that stipulates the exact price of a treatment (depending on the convention model and individual criteria).

Conventions 7.71 do not allow any cumulation with other nomenclature on the same day, whereas 9.50 does in the second phase of the convention (see 5.1.5.1).

Two centres are specific for multiple sclerosis patients. Two other centres are specific for traumatic brain injury patients. The three other centres can accept patients as defined on the pathology list (important orthopaedic and /or neurological rehabilitation) and one of these centres is also specific for epilepsy patients.

5.1.6.2 First type of 7.71 conventions (specific categoral rehabilitation centres)

For the first type of 7.71 conventions (centres 1 to 4 treating MS and TBI), the "price/full equivalent treatment" is calculated based on:

- Normal production capacity
- Personnel and operating costs

These elements are negotiated between the RIZIV/INAMI and the centres individually.

Figure 5.15 shows an overview of these data for the four centres. The tables on the left side focus on normal production capacity, the tables in the middle focus on the personnel and operating cost. The table on the right side focuses on the result (price/full equivalent treatment).

Figure 5.15: Cost model for centres 1 to 4 (7.71 conventions)

	In/Out	Eq.	Pl.	Days	Util.	Distr.	Cap.
	In	1	15	250	90%	43%	
Centre 1	In	0,66	5	250	90%	9%	**7830**
eq. = 3h	Out	0,66	25	250	90%	47%	

Costs	Index	No Index	Total €
Personnel	93%		1.111.618
Other	3%	4%	83.421
			1.195.039

Equivalent	1 (3h)	0,83 (2h30)	0,66 (2h)
Price	**153**	127	101

	In/Out	Eq.	Pl.	Days	Util.	Distr.	Cap.
	In	1	30	250	90%	36%	
Centre 2	In	0,66	12	250	90%	9%	**18927**
eq. = 3h	Out	0,66	70	250	90%	55%	

Costs	Index	No Index	Total €
Personnel	84%		2.858.670
Other	10%	6%	556.267
			3.414.937

Equivalent	1 (3h)	0,66 (2h)
Price	**180**	119

	In/Out	Eq.	Pl.	Days	Util.	Distr.	Cap.
	Out	1	10	236	90%	100%	**2124**
Centre 3							
eq. = 6h							

Costs	Index	No Index	Total €
Personnel	83%		423.149
Other	7%	9%	84.925
			508.074

Equivalent	1 (6h)	0,5 (3h)
Price	**239**	120

	In/Out	Eq.	Pl.	Days	Util.	Distr.	Cap.
	Out	1	10	236	90%	100%	**2124**
Centre 4							
eq. = 6h							

Costs	Index	No Index	Total €
Personnel	81%		374.207
Other	10%	9%	90.527
			464.734

Equivalent	1 (6h)	0,5 (3h)
Price	**219**	109

Source: RIZIV/INAMI 2006

Normal production capacity (activity)

- Capacity is limited. To calculate the normal production capacity the following indicators are used:
- An agreed number of places (Pl.), linked to equivalents (eq). For example: centre 1 has 15 places with equivalent 1 (3 hours treatment) for inpatients, 5 places with equivalent 0,66 (2 hours treatment) for inpatients (In) and 25 places with equivalent 0,66 (2 hours treatment) for outpatients (Out).
- Equivalents stand for a defined number of "treatment" hours. These equivalents are however not the same for centres 1-2 (3 hours) and centres 3-4 (6 hours), which hampers comparability.
- Working days/year (days). E.g. centre 1 has 250 working days , centre 3 has 236 working days
- The hypothesis of 90% utilization
- The above mentioned indicators determine the normal total capacity (formula → equivalent x places x working days x utilization rate (Util) = normal total capacity).
- If a centre exceeds normal capacity the reimbursements of expenditures is limited to a reduced percentage. If the centre exceeds a second threshold value (maximum capacity), the reimbursements of expenditures is limited to the lowest reimbursement ("overcap").
- It must be remarked that for centre 2, where the duration of an equivalent therapy session is defined as 3 hours and a 0,66 eq. as 2 hours, the actual treatment time for the patient is 4 repsectively 2,5 hours, as part of the therapy is given in group sessions.

Costs

- Personnel and operating costs incurred by the centres in the treatment activities are submitted to RIZIV/INAMI. These costs have to be negotiated and accepted by RIZIV/INAMI. Yearly, working costs are partly indexed, personnel costs are fully indexed.

Cost / full equivalent treatment

- To determine the cost for the "full equivalent" treatment, total costs are divided by normal total capacity. Equivalents are used to determine the cost of other levels of (limited) treatments.

SECOND TYPE OF 7.71 CONVENTIONS

The second type 7.71 convention does not have an explicit cost model (Centres 5, 6 & 7, limitative list of pathologies). The prices are set in negotiation with RIZIV/INAMI. Additional information on this (implicit) cost model was not found.

Full equivalents are based on a full day (6 hour) treatment.

Figure 5.16: Cost model centres 5 to 7 (7.71 conventions)

Center 5		
Equivalent	1 (6h)	0,5 (3h)
Cost Hosp.	117	62
Cost Amb.	102	54

Center 6		
Equivalent	1 (6h)	0,5 (3h)
Cost Hosp.	119	63
Cost Amb.	103	56

Center 7		
Equivalent	1 (6h)	0,5 (3h)
Cost Hosp.	122	66
Cost Amb.	106	58

Source: RIZIV/INAMI 2006

Centres 5, 6 & 7 do not have to limit production capacity and are as a consequence not directly subjected to limited expenses. Nevertheless they have to report production data for follow up to the RIZIV/INAMI.

BOTH TYPES OF 7.71 CONVENTIONS

Overall, the 7.71 system lacks transparency and important differences exist between pricing structures for the different centres.

Treatment sessions, even for the same underlying pathologies, is reimbursed differently for each centre (Figure 5.17). The comparison is based on theoretical (hourly) equivalents as stated in the different conventions.

Figure 5.17: Comparison of the cost per session for the 7.71 centres

Centre	1	2	3	4	5	6	7
Baseline (1h)	50	60	40	36	21	21	22
1h							
2h	101	119					
3h	153	180	120	109	62	63	66
6h			239	219	117	119	122

Source: RIZIV/INAMI 2006

One can argue that this might be justified by the complexity of the treatment, personnel involved and infrastructure used but these differences mainly seem to be the result of historical negotiations rather than based on objective quality indicators.

Other minor differences exist between the individual conventions:

- Centres 3 & 4 accept only outpatients. Centres 1 and 2 (and 5, 6 and 7) treat in- and out patients. The price of the outpatients conventions is significantly higher than for inpatient. The assumption is that the financing is supposed to be partly covered by hospitalisation 'day-price'.
- The total number of expected working days (used for calculating the required staffing levels) is different for centres 1-2 (250 days) versus centres 3-4 (236 days); they are not specified for the centres 5-7;
- The percentage of the costs that are indexed vary between the institutions (Centres 1 to 4) because of:

- A different repartition of the personnel costs (fully indexed) between centres
- A different repartition of indexed and non indexed other costs between centres

Yearly indexation exists for each agreement. The centres 1 to 4 can also request update of prices through the negotiation of the personnel and working cost and through the negotiation of production capacity standards.

5.1.6.3 Target groups for the 7.71 Convention

Figure 5.18: Pathologies for the 7.71 convention

Source: RIZIV/INAMI 2006

Pathologies	1	2	3	4	5	6	7
Paraparesis					X	X	X
Tetraparesis					X	X	X
Paraplegia					X	X	X
Tetraplegia					X	X	X
Traumatic brain injury			X	X	X	X	X
Neurosurgical intervention on the brain					X	X	X
Guillan-Barré syndrome					X	X	X
amyotrofic lateral sclerosis	X	X			X	X	X
Wilson's disease	X	X			X	X	X
Friedreich's ataxia	X	X			X	X	X
olivopontocerebellar atrophy	X	X			X	X	X
multiple sclerosis	X	X			X	X	X
leukodystrophy	X	X			X	X	X
Arnold-Chiari deformity	X	X			X	X	X
syringomyelia	X	X			X	X	X
Hemiplegia/hemiparesis with severe neuropsychological impairments that can be shown objectively					X	X	X
Complete monoplegia of an upper limb					X	X	X
Amputation of an upper limb above the hand					X	X	X
Amputation of an lower limb at the thigh in the proximal 1/3 or with desarticulation of the hip					X	X	X
Amputation of both lower limbs at the tibia or femur					X	X	X
rheumatoïd arthritis in a Steinbrocker stadium III and IV					X	X	X
spondylitis with peripheral lesions in a Steinbrocker stadium III en IV, with eventual neurological complications					X	X	X
Multiple trauma: bone-, articular or neuromuscular lesions at several limbs, or complex wounds at the head, trunk or pelvis with lesions of the internal organs					X	X	X
Epilepsy					X		

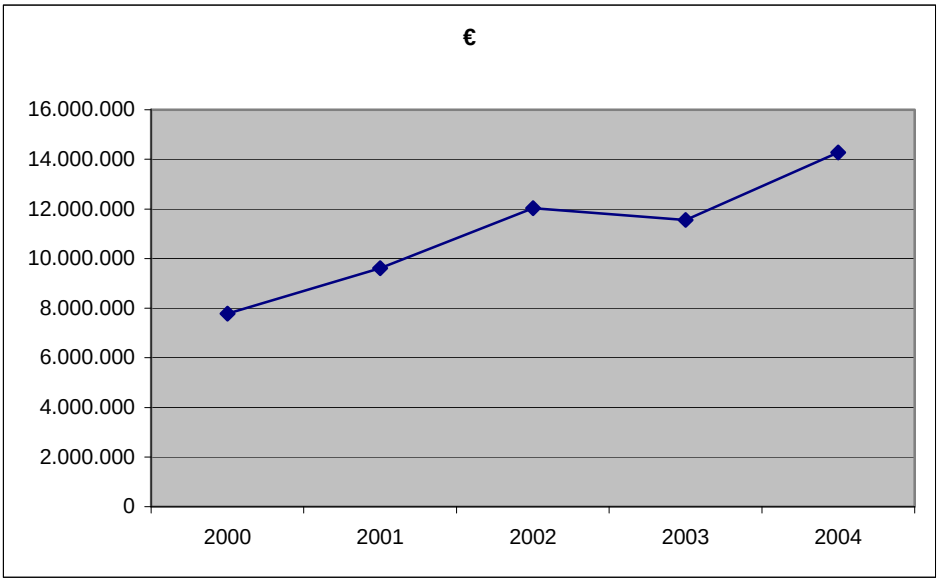
5.1.6.4 Requirements (7.71 conventions)

In this table we list common requirements for all accredited 7.71 centres, with an explanation of small differences in requirements.

Team	
Management	All centres have a managerial position
Support	All centres have a support team (secretary, maintenance)
Team	All centres have a multidisciplinary team led by a Physician in Rehabilitation Medicine. The team composition is adapted to the target group of the centres. The team and the accepted personnel cost is agreed per centre with the RIZIV/INAMI.
Experts	All centres have the possibility to involve external experts in the rehabilitation program.
Availability	
Opening hours	Centres accepting inpatients have a 7/7, 24h scheme, others accept only outpatients (centres 3 & 4).
Capacity	Capacity is limited for centres 1 to 4. The other centres have no formally limited capacity in the convention agreement, but have to submit production data for follow up.
Infrastructure	
Equipment	Each centre has the obligation to provide the necessary equipment for all rehabilitation programs and extra-treatment activities. Given the large diversity in core competences of the different centres, these requirements depend on the rehabilitation context and are only implicitly stipulated.
Buildings	Each centre has to provide the necessary buildings to accommodate patients.

5.1.6.5 *Detailed overview expenditures evolution convention 7.71*

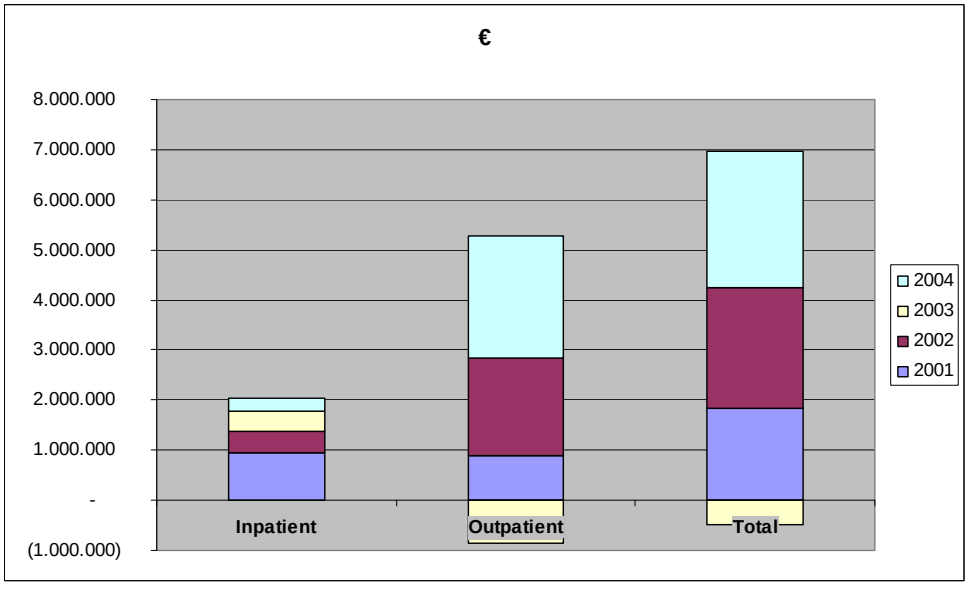
Figure 5.19: Expenditures evolution 7.71 conventions in Euro for the 7 centres between 2000 and 2004.



Source: RIZIV/INAMI 2006

As the only classification of expenditures in the accounting system is in- and outpatients, a detailed overview of the expenditures evolution (real growth) in the conventions 7.71 based on in- and outpatients is provided.

Figure 5.20: Detailed expenditures evolution for in versus outpatients 7.71 in Euro for the 7 centres between 2000 and 2004.



Source: RIZIV/INAMI 2006

The majority of the expenditures growth is attributed to outpatient treatment. Only 2003 has a negative overall growth in expenditures, for which there is no clear explanation.

Although the majority of treatment sessions is in the segment of inpatients (See Figure 5.20: 62%), growth in the period 2001-2004 is mainly explained by the outpatient segment (cfr. infra).

5.1.6.6 Conclusion convention 7.71

This specific convention can be applied in 7 Belgian rehabilitation organisations for a limited list of mostly acute neurological and musculoskeletal disorders. Price setting is different for each convention. The fee is higher than in the 9.50 convention and the requirements more specified. This convention informally aims at patients with more complex rehabilitation needs even though the pathologies overlap with 9.50 as well as nomenclature.

5.1.7 K-Nomenclature

5.1.7.1 Cost model

The rehabilitation nomenclature is part of the nomenclature for medical interventions (chapter V, part 10, art.22 and 23). In the K-nomenclature there are diagnostic acts, therapeutic acts, rehabilitation acts and rehabilitation treatments (complex mono-disciplinary or multidisciplinary). For the scope of this study we only included rehabilitation acts and rehabilitation treatments.

The price of the sessions in the K-nomenclature is negotiated at a national level within the following actors:

- Medicomut
- Technical Medical Board (TGR / CTM)

Nomenclature can be subject to indexation if negotiated between a representation of the physicians and RIZIV/INAMI. Prices are set at a national level.

K-nomenclature is applicable on in and out-patients and is subject to indexation. K-nomenclature is a "fee for service" system where one fee covers the personnel and operating costs of a treatment session.

K-nomenclature makes a distinction between "rehabilitations acts (K15/20)" and "multidisciplinary rehabilitation treatments (K30/60)".

- Rehabilitation acts: treatment session supervised by a physician specialised in PM&R (mono-disciplinary treatment allowed).
- Multidisciplinary rehabilitation treatments: administered by different therapists (at least two disciplines, under the supervision of a physician specialised in PM&R). The unit of payment is based on hourly treatment (K-30: 1 hour; K-60: 2 hours and in the futureK-45: 1,5 hours).

So in K30 and K60 the duration of the treatment session is defined as respectively one or two hours whereas K15 and K20 activities have no specified duration per session.

The "new nomenclature", in application since August 2004, introduced new rehabilitation acts and treatments (all acts and treatments listed in Figure 5.21 under post-2004). A limitative list of pathologies (Figure 5.22) for the acts concerning multidisciplinary rehabilitation treatment (K30/60, more specifically codes 558810, -21, -32, -43) was also introduced in 2004. Another important difference is that while before August 2004 a preliminary agreement on behalf of the mutual insurance was necessary, whereas in the new nomenclature a notification is enough, which might lower the threshold for initiating multidisciplinary therapy. Figure 5.21 shows a general overview of the "new" K nomenclature:

Figure 5.21: Overview new K-nomenclature since Augustus 2004

K	Amb.	Hosp.	Description	Cost (€)	Max. number of treatments
Post-2004 treatments (Nomenclature change)					
20	558795	558806		20	18
15	558390			15	30
15		558423	*Rehabilitation act*	15	unspecified
30	558456	558460	*Complex incontinence*	31	60 / 1/2 year
60	558994		*Spine disorders*	61	36
Pre-2004 treatments					
30	558810	558821	*Multidisciplinary*	31	60
60	558832	558843	*Rehabilitation*	61	120
15	558434	558445	*Ex-post (Treatment)*	15	104

Source: RIZIV/INAMI 2006

5.1.7.2 Target groups K nomenclature

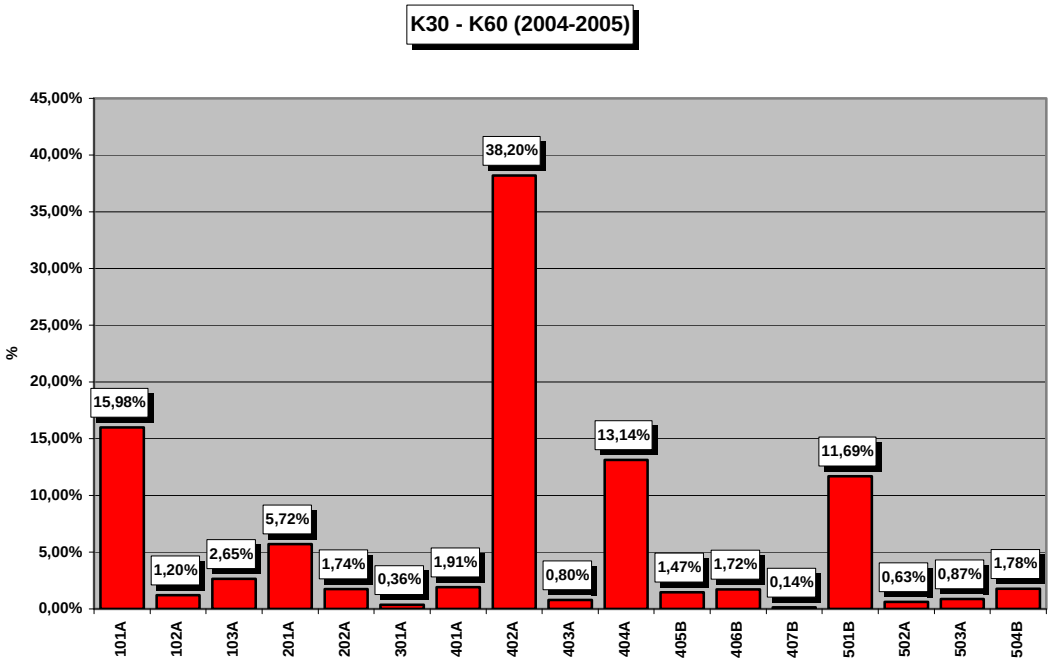
Based on the scope of the study, an overview of the target groups for the K30 and K60 nomenclature (multidisciplinary treatment) is shown in the table below. K30 intervention represents an expenditure of €31, K60 intervention represents an expenditure of €61 per treatment session. In February 2007 the Technical Medical Board (TGR/CTM) agreed on replacing K60 by K45 (ca €46) for code 402A: prosthesis of large + intermediate joints of the limbs. This adaptation has up to date not been implemented yet.

Figure 5.22: Limitative list of pathologies in K-nomenclature (K30/ K60)

K-Nomenclature	Cost (€)	Max. number of treatments
Central Nervous System		
101 A Cerebral lesions with neurological deficits	61	120
102 A Spinal cord injury/paraplegia-paresis/tetraplegia-paresis	61	120
103 A Progressive neurological disease after a clear change in functional autonomy	61	120
Peripheral Nervous System		
201 A Peripheral nerve lesion/radiculopathy/plexus lesion	61	120
202 A Polyneuropathy after a clear change in functional autonomy	61	120
Muscular system		
301 A Myopathy/myositis after a clear change in autonomy	61	120
Orthopedic diseases		
401 A Algodystrophy (Südeck), Frozen Shoulder (complex regional pain syndrome)	61	120
402 A Prosthesis of large + intermediate joints of the limbs	61	60
403 A Amputations UL/LL (except finger D2-D5)	61	60
404 A Orthopedic-functional impairment concerning the large + intermediate joints of the limbs	61	60
405 B Functional impairments due to severe tendon lesions with partial or complete interruption of continuity	31	60
406 B Vertebral crush fractures	31	60
407 B Fractures of the pelvis with ilio- and ischiopubic fracture with sacroiliacal dislocation after surgical correction	31	60
-Varia-		
501 B Postoperative or postintensive rehabilitation after an intervention >K180 or N 300 or after a stay of > 7 days in Intensive Care	31	60
501 A Scars of widespread burns with functional impairments during evolutive phase or after surgical/plastic correction	61	60
503 A Chronic rheumatic-evolutive joint diseases after a clear change in functional autonomy	61	60
504 B respiratory rehabilitation for obstructive of restrictive respiratory insufficiancy with a FEV1 < 60 % and/or proven desaturation, at demand of the pneumologist	31	60

Source: RIZIV/INAMI 2006

Figure 5.23: Relative distribution of pathologies treated with K30/60-nomenclature amongst the members of the Christian Mutuality (CM),during one year (1/8/2004 until 31/7/2005).



Source: Christelijke Mutualiteit 2005, dr. J.Boly

Figure 5.23 represents the relative distribution of pathologies treated with K-nomenclature during one year amongst the members of the Christian Mutuality (CM), one of the largest mutual insurances in Belgium. The information of the CM was used since this information is not available at the national level.

Group 402 A (prosthesis of large and intermediate joints of the limb) represents 38 % of the patients. Group 101 A (cerebral lesions with neurological deficits) has a patient proportion of 16 %, followed by group 404 A (orthopaedic functional impairment concerning the large and intermediate joints of the limbs) and group 501B (the postoperative or post intensive rehabilitation after an intervention > K180 or N300, or after a stay of > 7 days in intensive care).

The exact numbers of patients concerned in the different groups are respectively 8589, 3594, 2954 and 2628.

5.1.7.3 *Requirements (only valid for multi-disciplinary treatment K30/60)*

Team	
Management	-
Team	Physician in PM&R (Supervision) Physical Therapist (Permanent) Occupational Therapist (Permanent)
Available experts	Speech therapist Clinical psychologist
Infrastructure	
Opening hours	-
Volume	-

5.1.7.4 *Detailed overview expenditures evolution K nomenclature*

The K-nomenclature changed in august 2004. As a result different new codes were introduced. Because the old K-15 code was used for the new K-20 treatment, a comparative analysis on codes is impossible (different kind of treatments using the same nomenclature number). Therefore Figure 5.24 shows data for the period January – May 2004 (before introduction of the new K nomenclature) and January – May 2005 & 2006 (after introduction of the new K nomenclature) and it is expected that these data reflect the evolution of expenditures for the corresponding years. The data used are not the data based on the bills (invoices) for a certain month, but on the actually delivered treatment session during each of the corresponding months.

The old K-15 now is listed at the bottom of the table. Only K30 and K60 sessions are still under the same code. Colour code: orange is migrated to new nomenclature code / blue is new type of treatment / green is no change.

Figure 5.24: Effect on the expenditures evolution since the new K-nomenclature (2004-2006)

		2004/01-05			2005/01-05			2006/01-05		
Amb.	Hosp.	K	Expenditures	Cases	K	Expenditures	Cases	K	Expenditures	Cases
558795	558806	15	11.578.610	953.369	20	13.659.870	865.637	20	14.109.236	905.661
558390					15	717.496	61.767	15	703.343	60.482
	558423				15	729.449	59.331	15	799.231	65.397
558456	558460				30	416.951	14.971	30	457.250	16.467
558810	558821	30	5.923.618	194.882	30	2.740.072	97.872	30	3.467.961	123.887
558832	558843	60	22.660.162	373.921	60	29.103.125	519.468	60	32.398.290	578.547
558994					60	3.291.218	59.600	60	5.398.214	97.765
558434	558445				15	352.829	29.998	15	690.858	57.579

Source: RIZIV/INAMI 2006

Based on this sample of limited K codes, expressing the change in the K nomenclature in Augustus 2004, there is a 27% total growth in expenditures versus a 12% total growth in number of cases from 2004 to 2005. In 2006, as compared with 2005, we notice a 14% total growth in expenditures versus a 12% total growth in cases. This disparity suggests that the changes in the K nomenclature did not introduce any savings, on the contrary, expenses increased.

Within K30/60, we notice that the number of K30 (61.997 cases) decreased with over 50 %, while K60 (52.429 cases) increased with approximately 28 %, indicating a shift of K30 to K60, explaining an increase in total expenditures larger then the increase in cases.

Figure 5.25: Expenditures evolution of the K-nomenclature in Euro (2000-2004)

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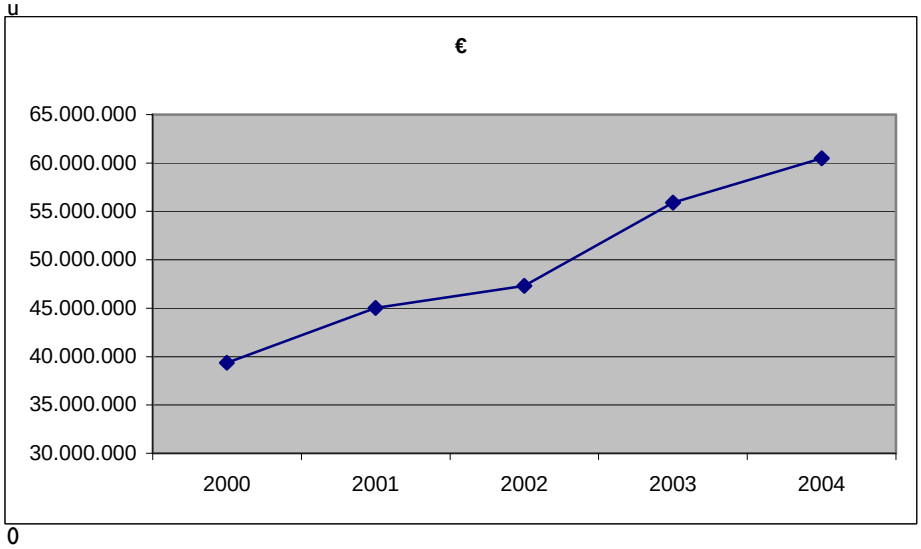

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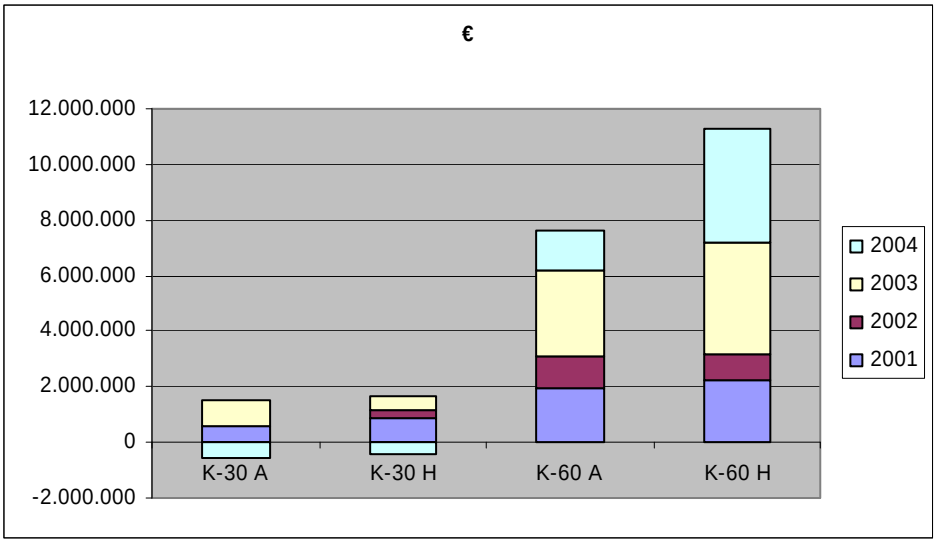
Figure 5.26: Detailed overview expenditures growth K-nomenclature (2000-2004)



Source: RIZIV/INAMI 2006

Because K30 and K60 treatments sessions are the only longitudinally comparable data, and since multidisciplinary therapy is the focus of this study, we excluded all other treatments from this graph.

K60 accounts for the largest part of the growth in expenditures (€) and has no negative growth during the period under review. The expenditures for K30 increased in the period 2001 – 2004 with a negative growth in 2004 as well for ambulatory care out patients) as hospitalized patients (in patients).

As mentioned in 5.1.7.2, the Technical Medical Board proposed a measure in order to control this grow'th in K60 expenditures by replacing K60 for code 402A, which is the

largest pathology group in Figure 5.23, by K45. This measure will probably be implemented in the second half of 2007.

5.1.7.5 Conclusions K-nomenclature

For K-nomenclature, the largest diagnostic categories between 2000-2004 (before the revision) were: cerebral lesions with neurological deficits, prosthesis of large and intermediate joints of the limb, orthopaedic functional impairment concerning the large and intermediate joints of the limbs, and the postoperative or post intensive care rehabilitation.

The limitative list for treatment in K-nomenclature is roughly the same as the list with indications for the conventions, extended with some groups of orthopaedic disorders or postoperative status.

For the multidisciplinary part of K-nomenclature, the revision in 2004 caused an increase in cases as well as expenditures, especially due to an increase in use of K60. As such, the aim of the revision, expenditures reduction, was not reached. An explanation might be that only notification to the mutual insurance is now required whereas before a preliminary agreement on behalf of the mutual insurance was necessary. A first measure taken in 2007 to reverse this increase is the replacement for code 402A (prosthesis of large + intermediate joints) by K45.

5.1.8 Neuromuscular Reference Centre (NMRC)

5.1.8.1 Introduction NMRC

A neuromuscular reference centre (NMRC) is an organizational/functional unit, characterised by the following aspects:

- specific expertise related to neuromuscular disorders and
- multidisciplinary teamwork

The aim of an NMRC is to develop for and in collaboration with the patient and his/her advocates longitudinal (in all stages of the disease starting with diagnosis) optimal care, including rehabilitation, taking into account medical, paramedical, psychological and social aspects.

A NMRC is led by a specialised physician coaching a team of different specialised physicians, therapists and a multidisciplinary rehabilitation team.

The four "core medical disciplines" for neuromuscular diseases are: neurology, neuropaediatrics, genetic medicine and rehabilitation medicine. Besides these core disciplines, many other medical disciplines need to be represented in the NMRC (cardiology, ophthalmology, internal medicine…).

5.1.8.2 The rehabilitation activities of a NMRC

The NMRC rehabilitation programmes are customised programmes, starting from a detailed medical, paramedical, psychological, medical-technical, social and pedagogical or professional evaluation of the disorders of a patient and the related limitations and disabilities.

The programme is initially set up for the multidisciplinary rehabilitation team but all stakeholders (GP, institutions, ..) benefit from the written plan.

Every programme is "target" focused, taking into account and describing the related timeframe.

5.1.8.3 Cost model

The rehabilitation activities suppose execution of activities during a timeframe of one year.

Individual rehabilitation programmes require the set-up of a programme that needs to be communicated and discussed with the patient. At least two interventions of 1 hour by the rehabilitation team are necessary during the implementation phase.

Yearly price of the agreement was set at BEF44 738 (€1109.02). Ninety-five % of this amount is linked to the index (121.92 on October 1st, 1997).

This price does not include fees for other rehabilitation agreements sessions or activities as described in the nomenclature of medical activities.

The payment of this amount of money depends on:

- The condition to have at least 50 patients on a yearly basis for whom an approval was given;
- The minimum requirements of the rehabilitation team, specified in the section below;
- A non medical therapeutic intervention of 12 hours and a medical intervention of 4 hours (outside nomenclature) / patient / year.

5.1.8.4 Target groups NMRC

The most important neuromuscular disorders are:

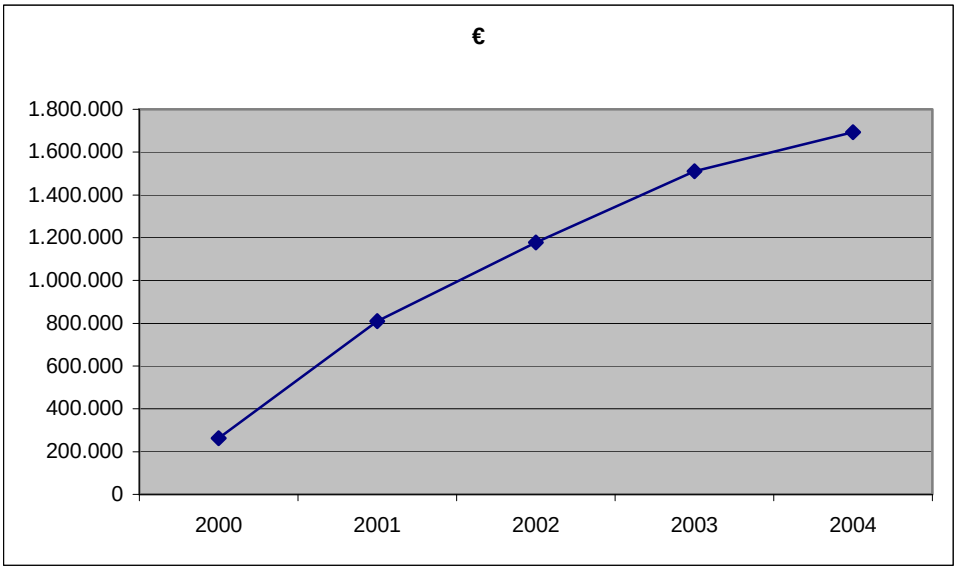
- Muscular dystrophies
- Congenital myopathies
- Inflammatory myopathies
- Neuromuscular junction disorders
- Myotonic syndromes and periodic paralyses
- Motor neuron disorders
- Inflammatory neuropathies
- Hereditary neuropathies
- Metabolic and mitochondrial disorders
- Degenerative (often hereditary) neurological disorders

5.1.8.5 Requirements

Team	
Management	NMRC: specialist physician (expertise and experience in diagnosis and treatment of neuromuscular disorders) Multidisciplinary rehabilitation team as a specified entity in a NMRC: Medical rehabilitation specialist
Team	The multidisciplinary rehabilitation team is composed of at least: Physician specialised in Rehabilitation medicine (0.5 FTE) Nurse (1 FTE) Physical therapist (0.5 FTE) Occupational Therapist (0.5 FTE) Psychologist (part time) Dietician (part time) Social worker (part time) Administrative worker (0.5 FTE) for every 50 patients included in the NMRC agreement
Experts	Besides the above mentioned core disciplines the rehabilitation team must prove they can rely on rehabilitation technicians at all times
Infrastructure	
General	Infrastructure needs to be adapted for wheelchair bound patients (accessibility of rooms)
Volume	Minimum capacity to ensure expertise with Neuromuscular disorders NMRC (general): min of 100 patients / year Multidisciplinary rehabilitation team: min of 50 patients / year
Opening hours	

5.1.8.6 Detailed cost evolution

Figure 5.27: Cost evolution of NMRC (2000 – 2004)



The expenditures are multiplied with a factor six (2000-2004), this is due to the recent introduction of this convention (start year 2000) which explains that new patients are added every year (2000: 232 patients; 2004: 1 379).

5.1.8.7 Conclusion

This type of rehabilitation agreement is different from the conventions 9.50 and 7.71. A fixed yearly price is paid for multidisciplinary follow up of a very specific group of patients, mostly in the chronic phase. This type of convention can be cumulated with fees for sessions of rehabilitation treatment.

The same type of convention also exists for chronic fatigue syndrome, cerebral palsy and spina bifida and chronic pain.

5.1.9 Evolution of the expenditures in musculoskeletal and neurological rehabilitation

The expenditures for musculoskeletal and neurological rehabilitation are mainly composed of the following components:

- Rehabilitation activities:

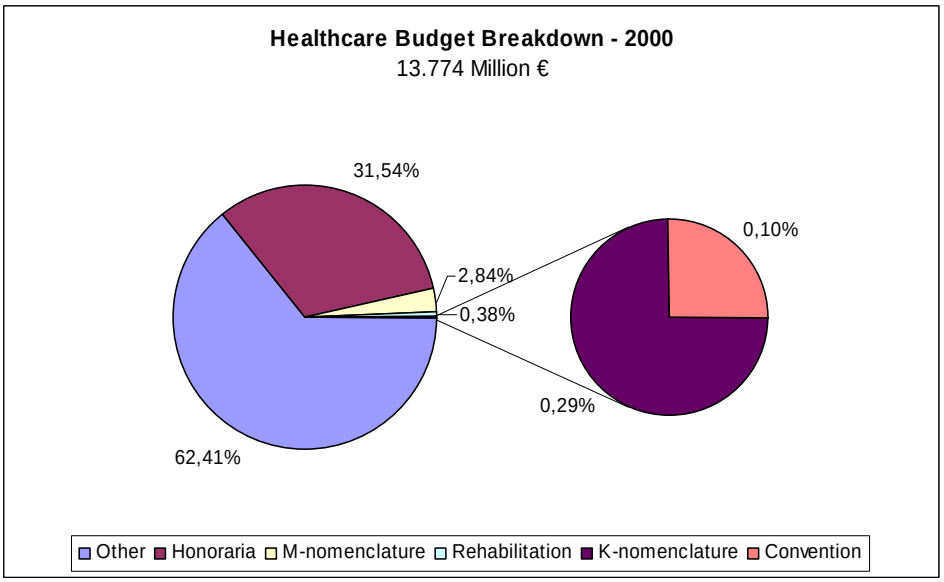
  K-nomenclature: rehabilitation activities performed in departments of physical medicine and rehabilitation

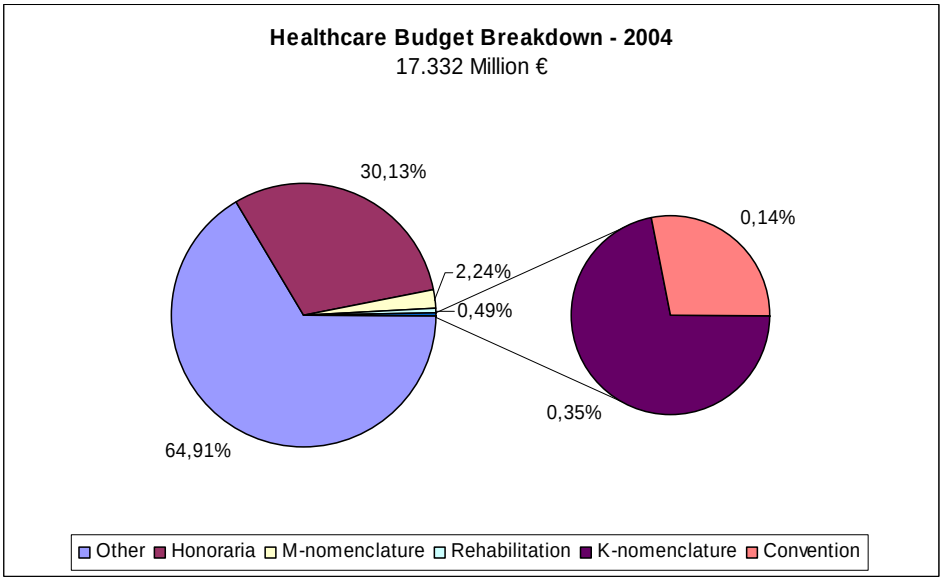
  Rehabilitation activities performed in centres with a convention 9.50

  Rehabilitation activities performed in centres with a convention 7.71
- Expenditures for transport convention
- Expenditures for reference centres (NMRC: convention 7892)
- Expenditures for mono disciplinary physical therapy (M-nomenclature) and speech therapy (R-nomenclature)
- Expenditures for hospitalisation, limited to Sp-beds (S2 and S3).

Before analyzing the trends in the expenditure evolution for musculoskeletal and neurological rehabilitation, a general overview of the Belgian healthcare budget is given. This permits to look at the detailed expenditures from an accurate perspective.

Figure 5.28: RIZIV/INAMI Healthcare Budget Breakdown (2000-2004)





Thousand €	2000	2001	2002	2003	2004
Health Care Budget	13.774.374	14.162.558	15.383.682	16.771.433	17.332.173
Honoraria	4.344.032	4.291.476	4.623.615	5.062.599	5.222.722
Rehabilitation	52.872	61.960	67.251	76.862	84.323
K-nomenclature	39.369	45.026	47.306	55.889	60.475
Convention total	13.503	16.934	19.945	20.973	23.848
Convention 950	5.454	6.511	6.738	7.904	7.886
Convention 771	7.786	9.613	12.030	11.557	14.269
Convention 7892	263	810	1.177	1.511	1.693
M-nomenclature	390.657	406.213	368.336	362.870	388.654
Other expenses	8.986.814	9.402.909	10.324.480	11.269.102	11.636.474

Source: RIZIV/INAMI 2006

Figure 5.28 details the total RIZIV/INAMI expenditures for the years 2000 to 2004. As the focus of this report is on musculoskeletal and neurological rehabilitation, only those expenditures that are relevant for the analysis are detailed. The pie charts give an overview of the percentage shares of the following expenditures clusters (for the year 2000 and 2004):

- Other expenses: total for all other expenditures (e.g. medicines, etc.)
- Honoraria: total of all medical honoraria
- Rehabilitation: sum of K-nomenclature and Convention expenditures
- K-nomenclature: all therapeutic expenditures
- Convention: all therapeutic expenditures (9.50 & 7.71); and NMRC expenditures (7892)
- M-nomenclature: all expenditures (hospitalized and ambulantory)

The first conclusion based on this analysis is the relatively small proportion of musculoskeletal and neurological rehabilitation in the total health care budget: 0.38 in 2000 and 0.49 % in 2004. Furthermore, the growth in absolute figures (M€31) for rehabilitation expenditures is small as compared to the growth of all medical honoraria (M€879). However, the relative increase is higher with 59% for rehabilitation against 26 % for the whole budget. Furthermore the expenditures in the M-nomenclature have stagnated in the period 2000-2004.

5.1.9.1 Expenditures for the rehabilitation therapeutic activities (K, 9.50, 7.71)

Figure 5.29 shows the expenditures (2000-2004) for the rehabilitation activities in K nomenclature[q], convention 9.50 and convention 7.71. K-nomenclature mops up the largest part of the budget. This seems logical because K can be applied in every department of PM&R, and before August 2004 also by physicians of other specialties with the supplementary specialisation in rehabilitation medicine, and thus the access is much wider than to conventions. Also, the fee for K60 was until August 2006 higher than for 9.50 (A2 and A2bis), which implies that most of the 9.50 centres first "used" K-nomenclature, and then only switched to convention. We presume that the proportion K/9.50 will now substantially change as 9.50 centres can no longer apply K30/60 for the concerned pathologies.

The expenditures for mono-disciplinary physical therapy (M-Nomenclature: mono-disciplinary physical therapy without supervision of a specialist in physical medicine and rehabilitation) and speech therapy (R-Nomenclature: same mono-disciplinary setting) are listed separately below in

[q] K-nomenclature is underestimated for 2004 due to newly introduced nomenclature codes, for more information please consult the K-nomenclature paragraph

Figure 5.29. As it was not possible to allocate a part of these expenditures to musculoskeletal and neurological rehabilitation (data not linked to pathology), these expenditures are not included in the total musculoskeletal rehabilitation expenditures.

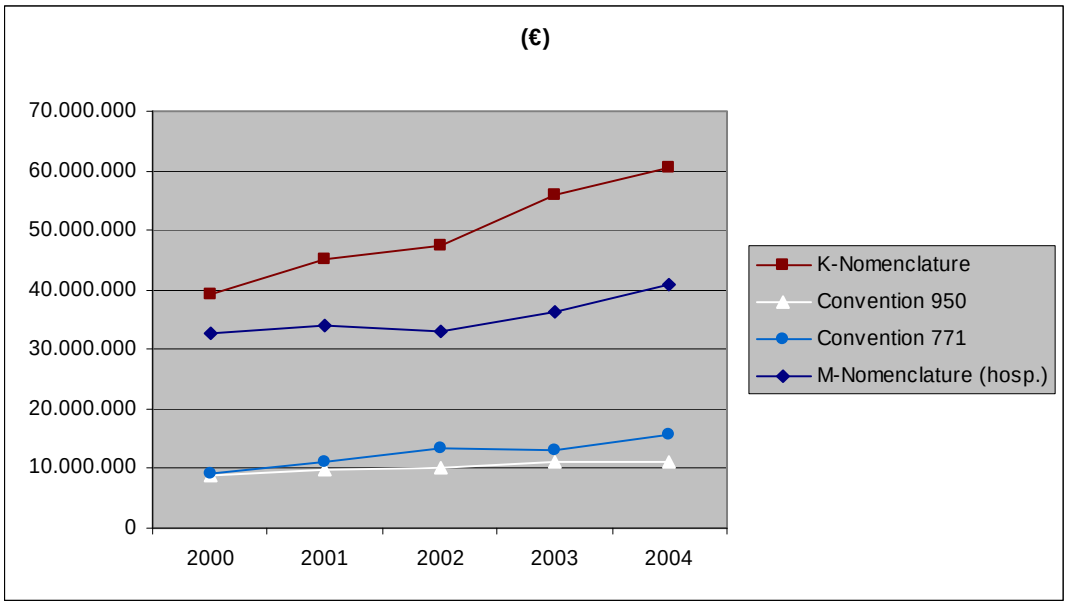
Figure 5.29: Overview of expenditures of K nomenclature, 9.50 / 7.71 conventions, M and R nomenclature

€	2000	2001	2002	2003	2004
K-Nomenclature	39.369.316	45.025.801	47.306.026	55.888.616	60.475.118
Convention 950	5.453.798	6.510.803	6.738.129	7.904.463	7.886.151
Convention 771	7.785.951	9.613.495	12.029.734	11.557.395	14.269.210
Total	*52.609.064*	*61.150.099*	*66.073.889*	*75.350.475*	*82.630.479*
M-Nomenclature	390.656.558	406.212.975	368.336.322	362.870.404	388.653.569
M - hospitalised	32.597.175	33.921.709	32.969.281	36.344.202	40.734.890
R-Nomenclature	29.838.549	34.937.563	37.253.976	41.704.034	46.587.119
R-hospitalised					601.166

Source: RIZIV/INAMI 2006

The expenditures evolution of the K nomenclature, M nomenclature (limited to hospitalised patients) and the conventions 9.50 and 7.71 is visualized in the Figure 5.30. When the expenditures are compared for K and M nomenclature with the expenditures for the conventions 9.50 and 7.71, the latter only represent a small part.

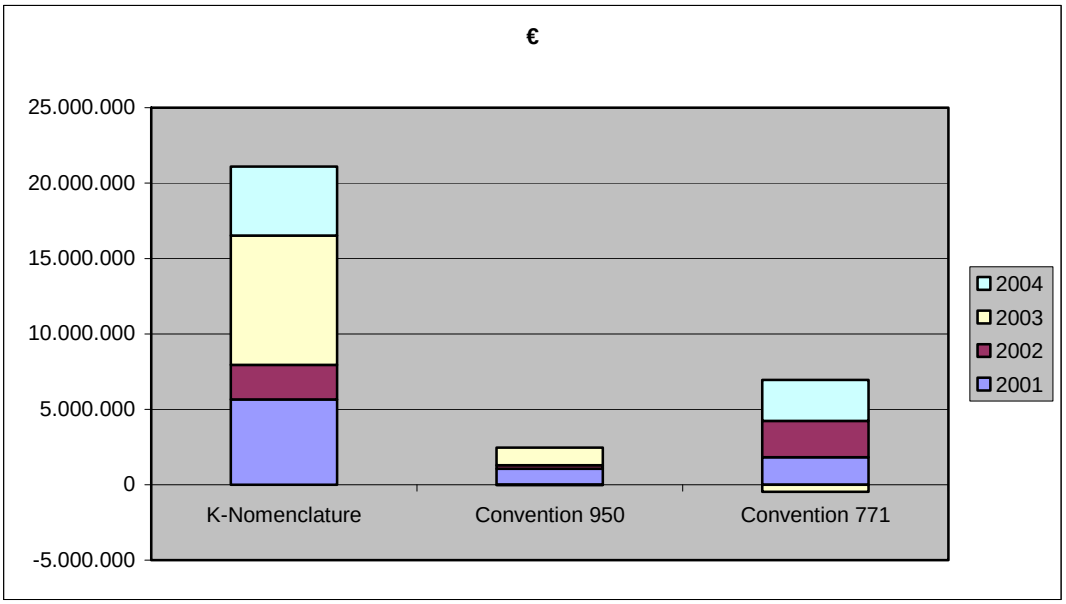
Figure 5.30: Evolution of the expenditures (in absolute figures) for the subsectors of musculoskeletal rehabilitation



Source: RIZIV/INAMI 2006

The evolution of the expenditures for each subsector in musculoskeletal and neurological rehabilitation shows that in absolute terms the K-Nomenclature accounts for the largest part of the expenditures growth (Figure 5.31).

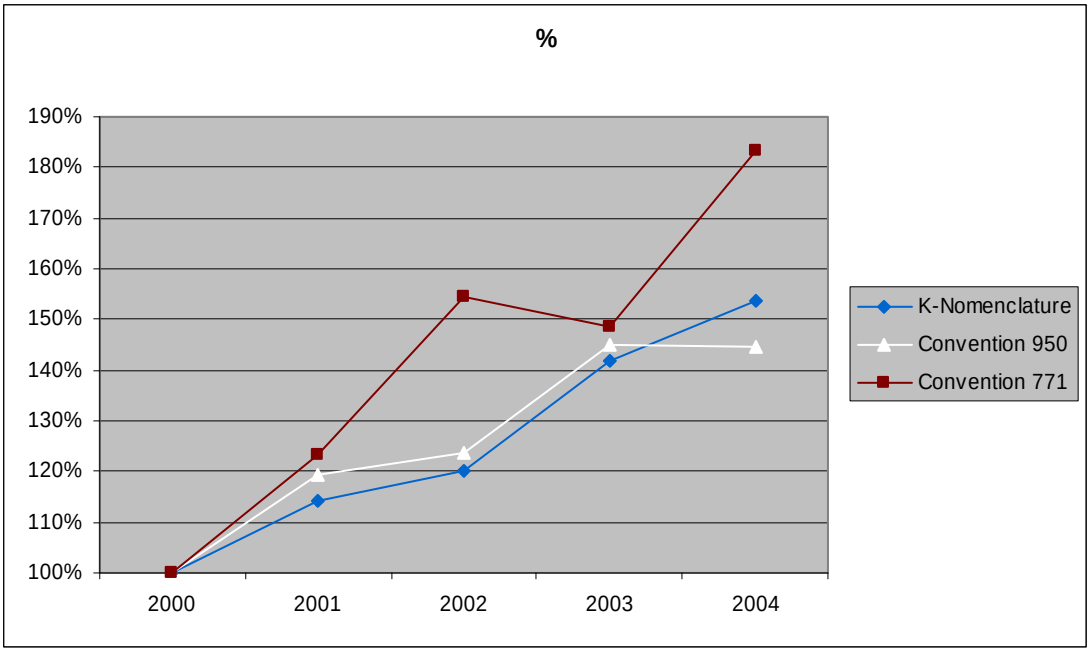
Figure 5.31: Yearly expenditures growth (absolute figures) for the subsectors of musculoskeletal rehabilitation



Source: RIZIV/INAMI 2006

Figure 5.32 shows the net growth (absolute) for each subsector from 2000 to 2004. The K-nomenclature expenses increase throughout 2000-2004 (net growth of €21 105 802). The convention 9.50 has a positive but relatively small growth of €2 432 354 for 2000-2004, the convention 7.71 shows a more significant growth in three out of four years, representing €6 483 259.

Figure 5.32: Trend analysis of the expenditures of the subsectors of Rehabilitation (%)



Source: RIZIV/INAMI 2006

The expenditures evolution in percentage points (2000 = 100 %) shows (Figure 5.32):

- K nomenclature: a growth of 50% during the period 2000 – 2004 with a slowdown in growth in the period 2001-2002.
- Convention 9.50: a growth of 45 % during the period 2000 – 2004 with a slow down in growth in the period 2003-2004
- Convention 7.71: a growth of 83 % during the period 2000 – 2004 with negative growth in the period 2002 – 2003.

The effect of the new K-nomenclature in August 2004 and the new convention 9.50 in July 2005 are analysed in the previous paragraphs.

Explanatory factors for the increase of the expenditures in the different subsectors might be the following:

During the last decade the length of stay (LoS) decreased significantly in the acute departments of the Belgian hospitals, due to the "PAL/NAL" system (a system in which a hospital is financially penalized if there are a "positive number of hospitalisation days", as compared to the country's average, taking into account differences in pathology between hospitals). This system was applied until July 2002. Since then, the system of "justified beds" has similar incentives. Patients are transferred to rehabilitation centres much sooner now. This had as a consequence that several acute beds were converted into Sp-beds (cf. KB 12-06-2002). So the number of Sp-beds grew over the last years. For instance, between 2002 and 2005 the number of neurological Sp beds increased from 1203 to 1304 and of musculoskeletal Sp beds from 1582 to 1915.

The number of departments PM&R grew the last decades and only few hospitals do not have a specialist in PM&R nowadays.

Another hypothesis is that due to 'progress in medicine', an increasing number of very severely ill (e.g. critically ill patients staying several months in intensive care) or severely disabled patients (e.g. high tetraplegics dependent on artificial ventilation) survive. So,

even though prevention for road traffic and working accidents improves, the need for rehabilitation seems to increase.

Part of the growth in expenditures is due to inflation. However, comparing the growth in the expenditures for rehabilitation to the overall growth in RIZIV/INAMI expenditures in Figure 5.28, it is clear that the growth in rehabilitation expenditures is larger than the overall growth in RIZIV/INAMI expenditures.

5.1.9.2 Relation between subsectors and in- versus outpatients

An analysis of the treatments, given to in- and outpatients in the different systems (based on the RIZIV-INAMI data from 2000-2004) gives following results:

Figure 5.33: Overview of treatments for in- and outpatients (cumulative for years 2000 to 2004)

Treatments	Inpatient		Outpatient	
K-nomenclature	3.303.654	63%	1.920.117	37%
Convention 9.50	249.351	22%	897.667	78%
Convention 7.71	312.134	62%	188.805	38%

Source: RIZIV/INAMI 2006

The proportion of treatment sessions, given to inpatient / outpatient is different for all systems:

- In the 9.50 convention the majority of the treatments focuses on outpatients
- In K nomenclature and 7.71 convention the majority of the treatments focuses on inpatients

The fact that in the 9.50 population there are substantially more outpatients, might be explained as follows:

- The transport convention is mostly linked to the convention system (mostly 9.50).
- It often happens that if a patient is a candidate for reimbursement of the expenditures for transport (only for wheelchair bound patients), he is "switched" from K to 9.50 when he is discharged from hospital and starting ambulatory rehabilitation. (This mechanism is impossible since the "new" 9.50 convention (cf. chapter 1.6), starting August 1st 2006.)
- Some centres with a 7.71 convention also have a transport convention. As they usually deal with severely impaired patients in an early post-acute phase, the majority of the patients is hospitalised. In the ambulatory phase they can be referred to a regional 9.50 centre, closer to the patients home.
- Some other 7.71 centres deal with chronic patients (mostly MS) and then thus often treat ambulatory patients

5.1.9.3 Expenditures of the "transport convention"

A specific expenditure that has to be added for the musculoskeletal and neurological rehabilitation sector is the expenditures of the "transport convention". This allows wheelchair bound patients to travel with reimbursement between their home and the rehabilitation centre. Several centres with a convention 9.50/7.71 have this transport agreement with RIZIV/INAMI.

The total fees (Source: RIZIV/INAMI 2006) account for the following cumulated (2000-2004) expenditures:

- Convention 7.71: €6 940 586
- Convention 9.50: €16 714 566

Based on the aggregated data (expenditures for transport were only available for the 5 years period 2000-2004 as a whole) is concluded:

- For the convention 7.71 transport fees account for 11% of the total expenditures (therapy + transport);
- For the convention 9.50 transport fees account for 33% of the total expenditures (therapy + transport).

This difference can be explained by the large proportion of outpatients in the 9.50 convention (78%) versus the lower proportion of outpatients in the 7.71 convention (38%)

5.1.9.4 Total expenditures for musculoskeletal and neurological rehabilitation

The total expenditures for musculoskeletal and neurological rehabilitation is calculated based on:

- K-Nomenclature: all treatment expenditures
- Convention 9.50 / 7.71: all treatment expenditures + transport fees (the total transport expenditure was distributed equally over the 5 years as only aggregated data were at our disposal)

Figure 5.34: Total expenditures for musculoskeletal and neurological rehabilitation (K nomenclature, 9.50/ 7.71 convention incl. transport fees)

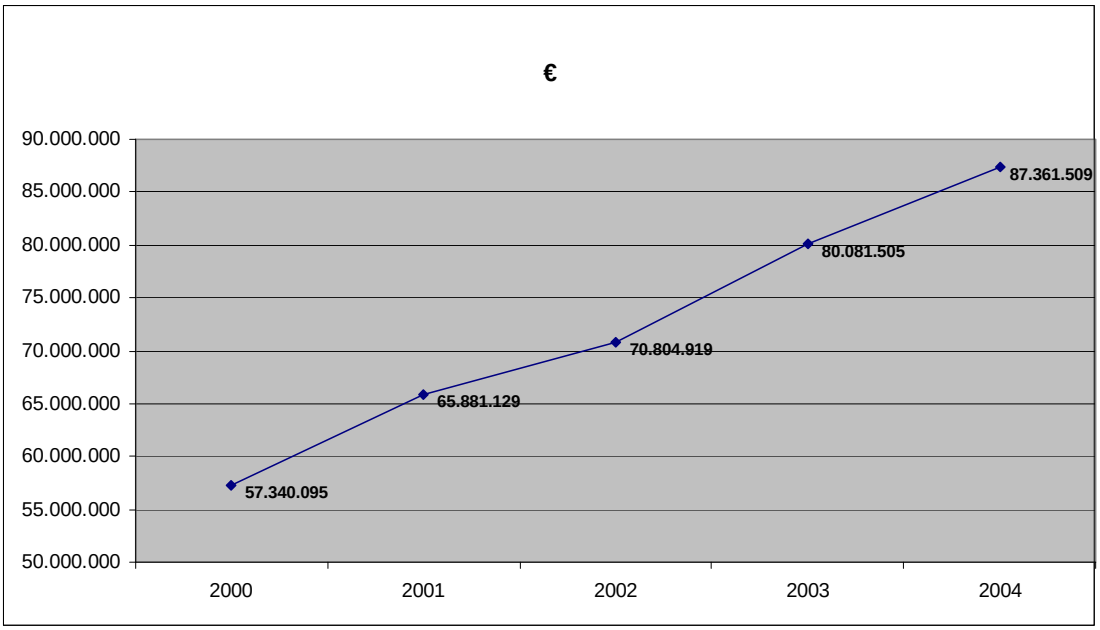
€	2000	2001	2002	2003	2004
K-Nomenclature	39.369.316	45.025.801	47.306.026	55.888.616	60.475.118
Convention 950	8.796.711	9.853.716	10.081.042	11.247.376	11.229.064
Convention 771	9.174.068	11.001.612	13.417.851	12.945.513	15.657.327
Total (incl. transport)	*57.340.095*	*65.881.129*	*70.804.919*	*80.081.505*	*87.361.509*

Source: RIZIV/INAMI 2006

As indicated before, these total expenditures are an underestimation of the total expenditures for musculoskeletal and neurological rehabilitation because the part of the M-nomenclature and R-nomenclature cannot be allocated to musculoskeletal and neurological rehabilitation (due to lacking data).

The total expenditures for musculoskeletal and neurological rehabilitation, as defined above, over a five year period (2000-2004) are visualised in Figure 5.35.

Figure 5.35: Evolution of the estimated total expenditures for musculoskeletal and neurological rehabilitation (Euro)



Source: Riziv/Inami 2006

The evolution of the expenditures for musculoskeletal and neurological rehabilitation has a high year-to-year growth rate that slows down from 2001 to 2002, but picks up in 2003.

The total expenditures growth for the three sub sectors in the period 2000 – 2004 is 52 %.

5.1.9.5 Expenditures for the Sp hospitalisation day price

Another expenditure that was not included in the above calculation is the day price that hospitals receive for a hospitalised patient. Musculoskeletal and neurological rehabilitation patients however can stay in different types of "beds" (cf. S2/S3) and will not always be in Sp-beds (also acute, geriatric, paediatric etc.). Therefore we include the total expenditures of the Specialist beds (Sp) as an indication, without including this in the total expenditures for musculoskeletal rehabilitation. The years do not correspond to those in the other paragraphs concerning K nomenclature and conventions but due to organisational changes at the Federal Public Service of Public Health (FOD Volksgezondheid/SPF Santé Publique) it was more coherent to analyse the data starting with the year 2003.

Figure 5.36: S-beds per type

		2003	2004	2005
S310	CARDIO-PULMONAIRES	426	463	449
S311	AFFECTIONS NEUROLOGIQUES	1219	1240	1304
S312	AFFECTIONS LOCOMOTRICES	1776	1856	1915
S313	AFFECTIONS CHRONIQUES	1084	1052	1021
S314	Service de soins palliatifs	369	373	385
S315	PSYCHO-GERIATRIE	1027	1029	1014
Total		5899	6013	6088

Source[r]: FOD Volksgezondheid/SPF Santé Publique 2006

Figure 5.36 shows that the proportion of S2/S3 to the total number of Sp-beds is approximately half of the total number of beds for the different years.

Figure 5.37: Total expenditures for Sp-beds

	2003	2004	2005
	€	€	€
Total hospital expenditures	10.190.433.459	10.645.257.850	10.516.129.503
Sp-beds expenditures	290.319.961	299.240.812	303.088.961
% of Sp-beds expenditures in total	2,85%	2,81%	2,88%
Average expenditure (day price)	217	204	212
Minimum expenditure (day price)	60	47	47
Maximum expenditure (day price)	911	473	683

Source: FOD Volksgezondheid/SPF Santé Publique 2006

The total expenditures of S-beds increase with 4% in 3 years. This is in line with the overall expenditure growth of hospital financing, where we notice a 3% growth in 3 years (Figure 5.37). Earlier data (2000-2002) are not comparable to later years, due to a change in the reimbursement scheme (ex-post to à priori).

The norms for specialist beds (cf. regulation on specialist beds[s]) stipulate that with an 80% occupancy ratio, the hospital has to provide additional therapeutic personnel. This does not cover other interventions financed by RIZIV/INAMI or other third parties.

- For every 30 S2/S3 beds, with 80% occupancy: 2 FTE occupational therapist, speech therapist or paramedical with relevant rehabilitation experience; availability of a psychologist

The requirements include minimal staffing for nurses and physicians. The day price[t] is composed of different elements (infrastructure, nurses, etc.).

5.1.9.6 Proportion cases/expenditures in the different subsectors

We notice in Figure 5.38 that the proportion of cases to the total expenditures is different for each sub sector (due to different pricing of the treatments).

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[r] There are two different databases for the inventory of S2/S3 beds. The first database gives an overview of the total number of beds at a certain point in time (e.g. figure 4), the second source calculates a year-to-date average of the total number of beds and takes into account the variation per institution in this given year (e.g. figure 30). These databases diverge for the indicator "total number of beds" given their different calculation.

[s] Koningklijk Besluit / Arrêté Royale – 21 October 1998

[t] FPS Public Health 2006

Figure 5.38: Cases and expenditures in the different subsectors

		2000	2001	2002	2003	2004
7.71	Cases	72.672	85.693	110.610	111.034	120.930
	Expenditures (€)	7.785.951	9.613.495	12.029.734	11.557.395	14.269.210
9.50	Cases	191.278	222.516	221.051	260.563	251.610
	Expenditures (€)	5.453.798	6.510.715	6.738.129	7.904.463	7.881.553
K-nom	Cases	860.448	972.456	1.003.236	1.139.764	1.237.337
	Expenditures (€)	39.369.316	45.025.801	47.306.026	55.888.616	60.475.118

Source: RIZIV/INAMI 2006

Case (as mentioned in the table above) or unit of treatment, is different for the three systems. The figure is therefore only included as an indication, but the different systems cannot be compared.

Until 2004, when the system of K-nomenclature was revised, the expense/case was significantly higher for the K-nomenclature than for the 9.50 nomenclature. The reason is not obvious. The expense/case is highest for the 7.71 conventions, in which a lot of highly specialized and intensive rehabilitation is provided.

5.1.10 Comparative analysis of the expenditures in the different systems

The comparability of the treatments and prices in the different systems is questionable. Comparing the fixed prices (equivalent of a 1 hour treatment, see table) in the different systems is not as transparent as seems at first. One should take into account that a treatment session can be provided with different intensity, different infrastructure and different multidisciplinary teams.

Figure 5.39: treatment expenditures for 7.71 / 9.50 conventions and K nomenclature

	Locomotor Rehabilitation								
	771							950	K-nom
Centre	1	2	3	4	5	6	7	*A2*	
Baseline (1h)	50	60	40	36	21	21	22	*13-39*	31
1h									31
2h	101	119							61
3h	153	180	120	109	62	63	66		
6h			239	219	117	119	122		

Source: RIZIV/INAMI 2006

- Convention 9.50: Expenses refer to the treatment for pathology group A2 after R30/60- the duration of a treatment session is unspecified. Therefore we give a range from 13€ (price/hour in case of 3h treatment) to 39€ (price/hour in case of 1h treatment) as a baseline expenditure.
- K-nomenclature: Expenses refer to K30 and K60
- Convention 7.71: Expenses refer to different treatment sessions (full day / half day, maintenance / intensive) and is recalculated to 1h in order to compare with the 9.50 convention and the K nomenclature

5.1.11 Comparative analysis of the current financing system

Table 1 in the Appendix to chapter 5 contains a comparative analysis of the current financial system.

Following items are compared:

- Price setting
- Price per hour of therapy
- Duration of therapy sessions
- Duration of the rehabilitation program
- Items covered by the price
- Payment system

The comparative analysis is made on the basis of the different pathologies as defined in the different systems, this may be directly, or indirectly by comparability of pathology (e.g. K: Chronic rheumatic progressive joint disease after a clear change in functional autonomy; 9.50: Severe musculoskeletal and psychological impairments due to rheumatoid arthritis in a Steinbrocker stadium III and IV; 7.71: Rheumatoid Arthritis in a Steinbrocker stadium III and IV).

It is important to know that per financial system (K, 9.50 or 7.71), the pathologies which are mentioned on their limitative list, are indicated in the table in bold.

* Bold = mentioned on the limitative list of this financial system;

* Standard = indirectly a candidate for this financial system because of comparability with a pathology that is mentioned on the limitative list.

* (Standard) in parentheses = indirectly a candidate for this financial system because of comparability with a pathology that is mentioned on the limitative list, but under certain conditions (See remarks per row).

The different financing systems for musculoskeletal and neurological rehabilitation in Belgium that were discussed extensively in the previous sections of this chapter will now be classified according to the typology model by Jegers et al. (2002) [123]. Figure 5.40 summarises the results focusing on the type of reimbursement (fixed or variable and retrospective or prospective). Taking into account the unit of reimbursement, all systems could be classified as more or less variable and prospective. Hence the financial risk is shared by the sponsor and the provider. The incentives are based on combining the unit of reimbursement, the type of reimbursement and the assumption on the height of marginal revenue compared to marginal cost. An arrow up (down) means that the financing mechanism creates incentives to increase (decrease) the respective items.

In spite of the fact that a considerable number of financing mechanisms for rehabilitation co-exist in the Belgian context, it is clear from this table that all systems are to a certain degree variable and prospective. Hence, they generate similar incentives : increasing the number of units of reimbursement (e.g. days, sessions, patients) and decreasing the intensitiy of care (and the cost) within the unit of payment. In addition, an incentive for selecting good risks is produced.

Figure 5.40: Incentives of the current reimbursement system for rehabilitation

Rehabilitation service/activity	Unit of reimbursement	Type of reimbursement	Assumption marg. revenue (MR) vs. marg. cost (MC)	Incentives	Remarks
Hospital stay **(Sp : S2, S3)**	**Patient-day**	**Variable – Prospective**	**MC<MR**	**- Inpatient Days ↑** **- Cost/day ↓** **- Intensity of care* ↓** **- Risk selection**	**Day price based on historical prices, adjusted for inflation**
K-nom.	**Item**	**Variable – Prospective**	**MC<MR**	**- Sessions /acts ↑** **- Cost/session ↓** **- Intensity of care*↓** **- Risk selection** **- Upcoding****	
Conv. 9.50	**Treatment session**	**Variable – Prospective**	**MC<MR**	**- Sessions ↑** **- Cost/session ↓** **- Intensity of care* ↓** **- Risk selection**	**First 60/120 sessions : uniform price per session (R30/R60)** **After 60/120 sessions : price related to pathology (no relation with duration)**
			MC>MR	**- Sessions ↓** **- Cost/session ↓**	**Maximum number of sessions and duration is determined, additional sessions (>max.) at reduced price**

REHABILITATION SERVICE/ACTIVITY	UNIT OF REIMBURSEMENT	TYPE OF REIMBURSEMENT	ASSUMPTION MARG. REVENUE (MR) VS. MARG. COST (MC)	INCENTIVES	REMARKS
				- Intensity of care* ↓ **- Risk selection** **- Accumulation with K, M**	
Conv. 7.71	**Treatment session**	**Variable – Retrospective** **Type 1: soft cap** **Type 2 : no cap**	**MC<MR**	**- Sessions ↑** **- Cost/session ↓** **- Intensity of care* ↓** **- Risk selection**	**Price per full equivalent treatment is negotiated with RIZIV/INAMI** **Type 1 :using cost model** **Type 2 : no cost model**
Conv. 7.89.2 (NMRC)	**Patient-year**	**Variable – Prospective**	**MC<MR**	**- Patients ↑** **- Cost/patient ↓** **- Intensity of care* ↓** **- Risk selection** **- Accumulation with nom.**	**Prospective (indexed) price per patient (one year), subject to minimum requirements on team and volume**
Remarks			**Generally, it is assumed that MC<MR, except for the additional sessions (> maximum number) in Conv. 9.50, financed at a strongly reduced price**	*** Within the unit of reimbursement (e.g. day, session, …)** **** Declaring more or higher fees than justified by actual activities**	

5.1.12 Conclusion

- Different financing systems exist for musculoskeletal and neurological rehabilitation in Belgium.
  - One is linked to hospital stay with specialised beds (Sp beds) for diagnosis and treatment of musculoskeletal (S2) and neurological disorders (S3).
  - Others are linked to rehabilitation activities and concern mainly nomenclature (K, M and R) and rehabilitation agreements (also called conventions). These systems are mainly fee for service systems.
- Sp-beds
  - The number of S2 and S3 beds gives an indication of the rehabilitation infrastructure, but is probably an underestimation as patients treated in the context of musculoskeletal and neurological rehabilitation can also stay in G, C, D, … beds. On the other hand, not all patients staying in S2/S3 beds need inpatient rehabilitation.
  - S2 and S3 beds are relatively well spread over the different Belgian provinces except for East Flanders and Namur where the number per 100 000 inhabitants is relatively low.
  - Price setting is mainly historical and not in correlation to the patient's needs for nursing care or rehabilitation activities. Sp beds account for about 3 % of the total hospital expenditure over the period 2003-2005.
- Mono-disciplinary nomenclature only exists for physical therapy (M) and speech therapy (R). No data are available concerning the part of these expenses in relation to musculoskeletal and neurological rehabilitation.
- K-nomenclature (Physical medicine and rehabilitation) explains the largest part of the expenditures for musculoskeletal and neurological rehabilitation, at least until 2004. The expenses increased with 50 % between 2000 and 2004.
  - K15/20: rehabilitation acts under the supervision of a physiatrist, can be mono- or multidisciplinary, duration of the session is not defined
  - K30/60: multidisciplinary rehabilitation sessions under the supervision of a physiatrist during respectively one or two hours. Limitative list of pathologies and 60 or 120 sessions can be reimbursed depending on the pathology
- A revised K-nomenclature was introduced in August 2004. The main changes are the limitative list of pathologies and the fact that an agreement on behalf of the sickness fund is no longer required, only a notification. The expenditures continued to increase, more than the number of cases, which is due to a shift from K30 to K60 (based on data of January-March 2004-2005).
- The most relevant conventions concerning post-acute rehabilitation activities are 9.50 (type convention, similar for all organisations) and 7.71 (specific convention for each organisation, three groups are recognisable).
- For the more chronic phase a specific type of convention for "reference centres" has been developed. Multidisciplinary follow up, as financed with these conventions is only foreseen for a very limited number of mostly progressive disorders.

- The geographical distribution of 9.50 and 7.71 conventions is relatively homogeneous in Belgium. Only the province of Luxembourg lacks a convention, and Brussels as well as West Flanders have a higher number of conventions, even corrected for number of inhabitants.
- Travelling expenses represent 11 % of the total expenditures linked to the 7.71 convention, 33 % of the total expenditures linked to the 9.50 conventions and is therefore not negligible. It is included in the convention 9.50 and 7.71 expenditures as discussed in the paragraphs below.
- The expenditures of the musculoskeletal and neurological rehabilitation sector as calculated in paragraph 5.1.9, are probably underestimated. Because there is no link between the M-nomenclature, R-nomenclature and their specific segment of musculoskeletal and neurological rehabilitation treatments it is not possible to allocate this part of the expenses.
- Total expenditure of musculoskeletal and neurological rehabilitation 2000-2004 is mainly explained by the K nomenclature (+/-68%), the 7.71 conventions (+/-18 %) and to a lesser extent by the 9.50 conventions (+/-14%).
- In the period 2000 – 2004 we noticed an expenditures growth (travel expenses included) of 52 % for musculoskeletal rehabilitation. In absolute data (€) this growth is mainly caused by the K-nomenclature (70%), but also the 7.71 conventions (20%) and the 9.50 conventions (10%).
- Looking at the three subsectors separately, there is a percentage growth of 50% for the K nomenclature, 45 % for the 9.50 conventions and 83 % for the 7.71 conventions.
- As shown in paragraph 5.1.10, the prices for each unit of payment, as well as per hour of therapy are very variable depending on the system.
- No link was identified between cost models and treatment. In general the only criteria used are the duration and total number of sessions, the target groups and some limited team requirements.
- As shown in Table 1 (see Appendix) (comparative analysis), the overlap in pathologies between the different systems (convention 9.50, convention 7.71 and K nomenclature), indicates that there is no clear mandate for the different subsectors. Most of the patients and pathologies (except for three pathologies from the limitative K30/60 list) can be treated in the three different systems. This has implications for the expenditures per treatment, the expertise of the team and the maximum number of treatments. This is changing August 1st 2006, with the application of the "new" 9.50 convention and the creation of a R30/60. A centre with a 9.50 convention can no longer use K30/60 for the patients included in the convention. In exchange an R30/60 has been created with the same conditions as K30/60. This should limit overlap and clarify the situation.
- No clear criteria for patient referral exist (patient classification system), which worsens the overlap situation. A referral system based on clinical criteria could increase the transparency of the system.
- Indicators such as severity, complexity, age, co-morbidity, rehabilitation needs and goals, etc. are not included in the cost model.
- Except for the inspection visits controlling quality in Sp services (in Flanders), there are no other explicit quality or accreditation systems in musculoskeletal rehabilitation in Belgium.

The mix of the different types of rehabilitation centres guarantees a range from very general to highly specialised treatment in the Belgian rehabilitation landscape. However, due to a lack of formalised coordination and patient classification system with criteria for referral between the different levels of rehabilitation and a good description of the roles and tasks of all types of rehabilitation, the system lacks transparency.

Key points

- **The organisation and financing of musculoskeletal and neurological rehabilitation in Belgium lacks transparency and clinical coherence.**
- **Several parallel payment systems exist but are mostly based on historical factors rather than on criteria related to patients' rehabilitation needs and goals.**
- **One payment system is linked to hospital stay with specialised beds (Sp beds) for diagnosis and treatment of musculoskeletal (S2) and neurological disorders (S3).**
- **Other systems are linked to rehabilitation activities and concern mainly nomenclature (K, M and R) and rehabilitation agreements (also called conventions). These systems are mainly fee for service systems.**
- **Several combinations (parallel as well as sequentially) of the different payment systems are possible, inducing a very heterogeneous rehabilitation landscape in Belgium.**
- **The different payment systems overlap significantly.**
- **There are no clear criteria for patient referral to the different types of rehabilitation organisations and the only characteristic on the limitative lists is the medical diagnosis.**
- **There are no criteria justifying an inpatient treatment.**
- **Patients' rehabilitation needs and goals are not formally assessed.**
- **Sp-beds are financed on a 7/7 days basis, discouraging week-ends home. Neither is there reimbursement for travel expenses for week-ends home (see further: transport convention).**
- **There is no systematic registration of data concerning the performed rehabilitation activities.**
- **There is no accreditation system and only very limited formal quality control.**
- **The different rehabilitation organisations are geographically relatively well spread, but there is no convention in the province of Luxemburg. The number of conventions, corrected for population density is high in the region of Brussels capital and West Flanders. The number of Sp beds (S2 and S3) is relatively low in the provinces of East Flanders and Namur.**
- **There is nomenclature for mono-disciplinary physical therapy and speech therapy, but not for other disciplines such as occupational therapy or psychotherapy.**
- **Reimbursement for travel expenses is only provided for wheelchair bound patients and only for ambulatory treatment.**
- **The RIZIV/INAMI expenditures for (multidisciplinary) musculoskeletal and neurological rehabilitation were 0.38 % in 2000 and 0.48 % in 2004.**
- **In absolute figures the expenditure for musculoskeletal and neurological rehabilitation grew about 50 % over a five year period, 2000-2004.**

- **K-nomenclature and convention 9.50 changed significantly in 2004 and 2006. It is too early to estimate the impact of these changes but there is a trend towards increased expenses for multidisciplinary K-nomenclature.**
- **A payment system for follow up of patients with permanent functional impairments due to musculoskeletal or neurological disorders in the chronic phase, exists only for a very limited number of pathologies (such as neuromuscular disorders).**
- **Price setting for each unit of payment, as well as per hour of therapy depends on the system, is not transparent and mainly based on historical facts.**
- **Within the convention 7.71 the reimbursement per hour for organisations with ambulatory treatment only is higher than for some organisations with hospitalisation.**
- **All financing mechanisms can be qualified as variable and prospective, generating similar incentives : increasing the number of units of reimbursement and decreasing the intensitiy of care (and the cost) within the unit of payment. In addition, an incentive for selecting good risks is produced.**

6 SURVEY CONCERNING CLINICAL PRACTICE IN BELGIUM (FIVE CASES)

6.1 INTRODUCTION

In a previous chapter the current Belgian organisational and payment system is described. In this part of the report possible rehabilitation paths out of Belgian daily practice are presented. The scenarios will be indicative but not exhaustive, and serve as a qualitative illustration. This will be done for five patient cases. In each case an individual is described with functional impairments as a consequence of one of the five earlier selected pathologies: amputation of a lower extremity, multiple sclerosis, spinal cord injury, stroke and total hip replacement. Information on daily practice is collected by means of a questionnaire interview, addressed to twelve practitioners.

Practice pattern variations are expected based on the results of the analysis of the current Belgian organisation and payment system for neurological and musculoskeletal rehabilitation (chapter 5), and of previous reports[u] concerning the Belgian situation. These analyses demonstrate that differences in rehabilitation supply, as well as in payment systems exist, depending on the type of rehabilitation organisation. Practice pattern variations can induce a difference in cost for the government, private insurers and patients, and maybe also variability in outcome and/or quality of care. Data on differences in outcome or quality are not available.

6.2 METHODOLOGY

A questionnaire was developed, containing five parts. Each part includes a case of a patient with functional impairments as a consequence of one of the earlier selected pathologies: spinal cord injury, multiple sclerosis, amputation of a lower extremity, stroke and total hip replacement. Each patient is described by a medical diagnosis, co-morbidities, a rehabilitation diagnosis, the level of functioning by use of the 'SAMPC' ("Somatisch, ADL, Maatschappelijk, Psychisch, Communicatief" or "Somatic, activities of daily living, social, psychological, communicative")-model [136] and the level of dependence by use of the FIM (Functional Independence Measure). The letter, the cases and an example of the questionnaire are included in attachment.

As the difference between a medical diagnosis and a rehabilitation diagnosis might be unclear, we give an example: "An individual with the medical diagnosis of coxarthrosis has after a surgical intervention during which a total hip was implanted, a rehabilitation diagnosis of total hip replacement."

For each patient case a part with closed answers and a part with open answers was developed.

The goal of the part with closed answers was an identification of the current practice. This part contained a multiple choice table representing the duration of each phase of the rehabilitation process (according to the responder of the questionnaire) as well as the possible combinations of treatment packages, as identified by payment systems. For each phase in the rehabilitation process a choice for a payment system could be made. Each practitioner was asked to indicate a programme comparable to the programmes in his/her daily practice.

The goal of the part with open answers was to formulate propositions to optimise the current practice. In the part with open answers each practitioner could propose an ideal programme for the patient without the restrictions of the current accessibility to payment systems and the current Belgian organisational model, but still based on her or his experiences.

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[u] Referenties [131]; [132]; [133]; [134]; [135].

Because of time constraints our questionnaire was not validated for use in practice and because it was not our objective to compose an exhaustive list of possible rehabilitation programmes, only a limited set of practitioners was selected. The questionnaire was sent to six practitioners of the Dutch speaking part of Belgium and six practitioners of the French speaking part of Belgium. Of the Dutch speaking practitioners 1 works in a rehabilitation organisation with convention 7.71, 3 work in a rehabilitation organisation with convention 9.50, 2 work in a rehabilitation department without any convention. Of the French speaking practitioners 1 works in a rehabilitation organisation with convention 7.71, 2 work in a rehabilitation organisation with convention 9.50, 1 works in a rehabilitation organisation with conventions 7.71 and K-nomenclature, 1 works in a rehabilitation department without any convention. The response rate was 75% (9/12). One of the twelve practitioners preferred not to participate because of the fact that he/she had not enough experience in the several domains. Two others did not respond at all.

The results of the closed answer part of the questionnaire are represented in graphs. Of the open answer part of the questionnaires a synthesis of the propositions was made.

6.3 RESULTS

6.3.1 Actual rehabilitation programmes

6.3.1.1 Notifications

There are differences in duration of sessions. For example a session under K30 goes on for 60 minutes and a session under K60 goes on for 120 minutes. In the graphs, we only took into account the number of sessions and not the duration of the sessions because the duration of sessions is not asked in the questionnaire. This is a shortcoming of our questionnaire because only K-nomenclature includes a strict identification of duration of sessions, within the conventions 7.71 the duration of sessions can vary from 2 to 6 hours, within the 9.50 conventions there is not at all a definition of duration of sessions included.

There can be differences in the "composition" of the team responsible for the treatment in the different systems as discussed in chapter 5. A team usually includes a physician specialised in rehabilitation medicine, a physical therapist, an occupational therapist, a speech therapist, a psychologist and a social worker.

The conditions for the payment modalities can differ. For example a polytrauma patient can be treated under K60 or Convention 7.71 but not under Convention 9.50.

For a detailed description of the duration of sessions, the composition of the team and the conditions for certain payment modalities, we refer to chapter 5.

To understand the graphs it is important to know that every rehabilitation programme is defined by 2 digits and 1 letter. For example: '11a':

- The first digit = the reference to the pathology (1= Lower Extremity Amputation; 2= Stroke; 3= Multiple Sclerosis; 4= Spinal Cord Injury; 5= Total Hip Replacement);
- The second digit = the reference to a rehabilitation organisation, these organisations are kept anonymous;
- The letter = the differentiation of optional programmes in one rehabilitation organisation, for example: a = one optional programme; b = a second optional programme, as proposed by the specialist of the concerned rehabilitation organisation.

A rehabilitation process consists of several phases. The distinction between the phases is based on a difference in treatment packages. Examples of phases are:

- An inpatient rehabilitation in an acute care service or in a Sp-service;

- An outpatient rehabilitation in a rehabilitation organisation, in a service for physical medicine and rehabilitation, in a private physical therapy practice or at home.

These phases are in relation to the progress of a health condition.

For each separate respondent, the number of rehabilitation sessions per rehabilitation phase is calculated by [duration of a rehabilitation phase (months) * Sessions per week * 4]. If several payment systems are drawn on during one phase, the sum of the number of rehabilitation sessions of each payment system is calculated.

The reimbursement per rehabilitation programme is calculated by [the number of rehabilitation sessions * price per session]. The cost of equipment for example is not calculated (see chapter 5)!

6.3.1.2 Sum of rehabilitation sessions per patient case and per respondent

Each of the next five graphs represents a possible number of rehabilitation sessions for one patient case. The values on the X-axis are explained under "Notifications" (see 6.3.1). The values on the Y-axis represent the number of sessions.

Figure 6.1: Sum of rehabilitation sessions per patient case and per respondent - Lower extremity amputation

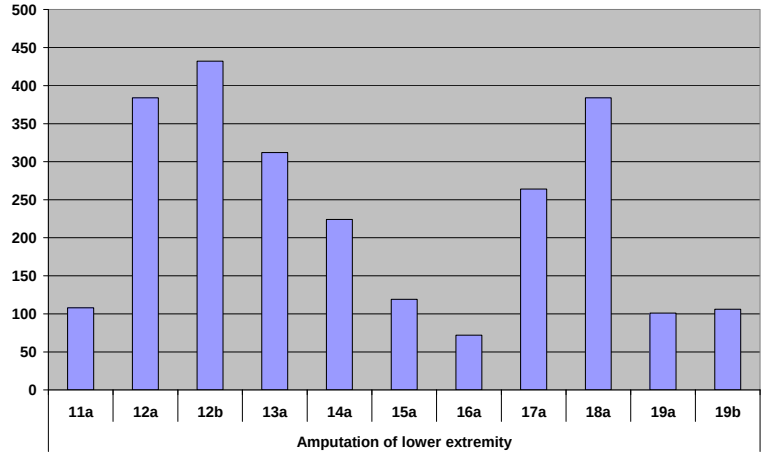


Figure 6.2: Sum of rehabilitation sessions per patient case and per respondent – Stroke

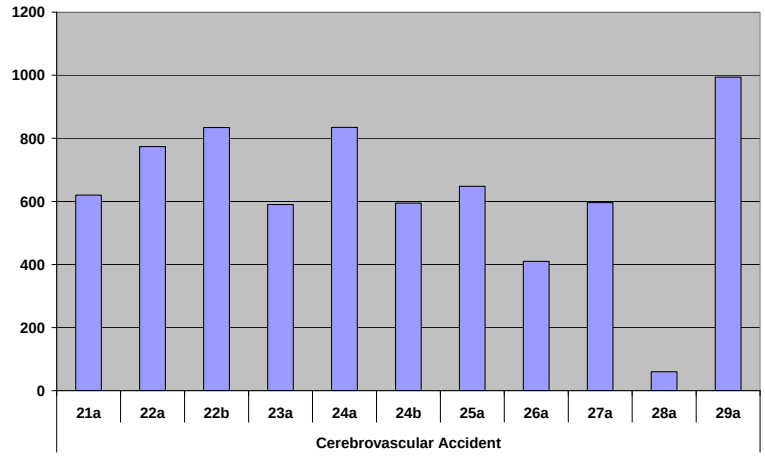


Figure 6.3: Sum of rehabilitation sessions per patient case and per respondent – Multiple Sclerosis

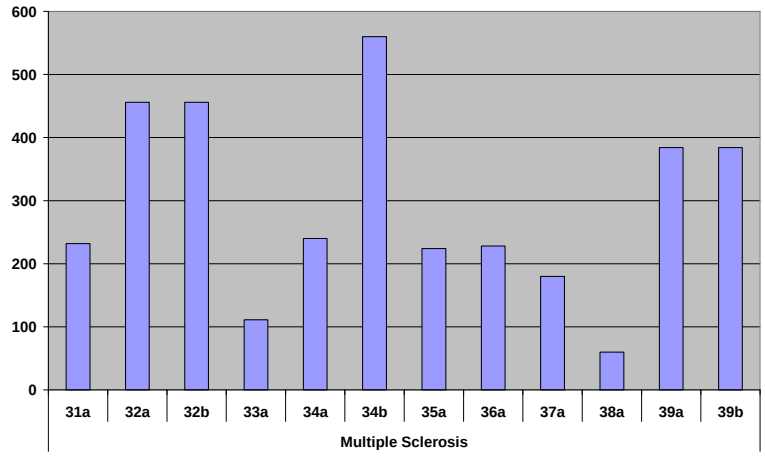


Figure 6.4: Sum of rehabilitation sessions per patient case and per respondent – Spinal Cord Injury

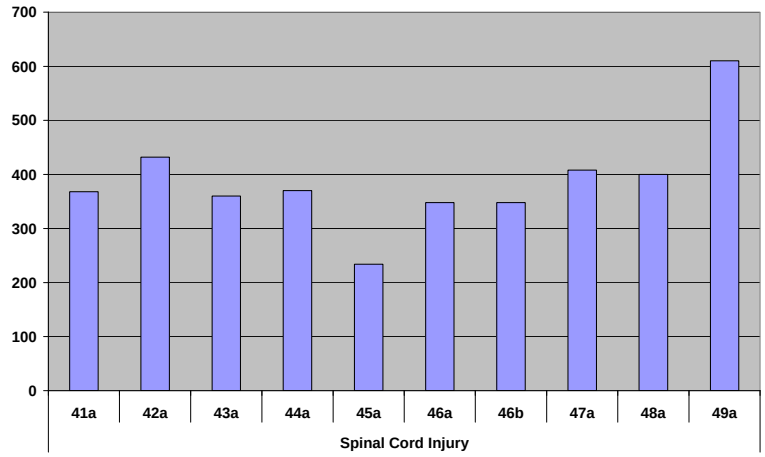
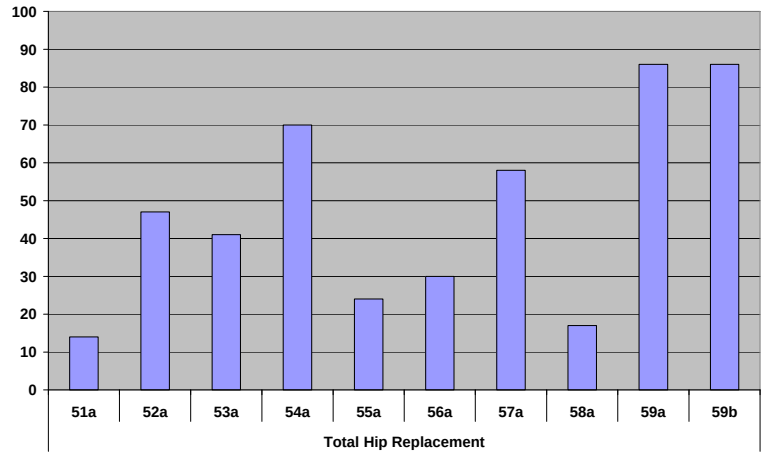


Figure 6.5: Sum of rehabilitation sessions per patient case and per respondent – Total Hip Replacement



Key Points

- **There is a clear variability in number of rehabilitation sessions per patient case as proposed by the different respondents. *For example:* A patient with an amputation of a lower extremity gets less than 100 sessions in one rehabilitation organisation and more than 400 sessions in another organisation.**
- **For all respondents, the number of rehabilitation sessions is higher for patients after stroke, spinal cord injury and multiple sclerosis then for individuals after amputation of a lower extremity or a total hip replacement.**

6.3.1.3 *Type of payment system drawn on per phase in the rehabilitation process*

Each of the next five graphs represents some possible types of payment systems drawn on per phase in the rehabilitation process, for one patient case.

The numbers mentioned on the X-axis refer to the phases as well as to the payment systems. Per phase we applied a different colour. The payment systems (K30, K60, M, 7.71, 9.50) are discussed in detail in chapter 5.

The numbers mentioned on the Y-axis refer to the frequency a financing system is proposed by responders per phase in the rehabilitation process. Per phase the total number depends on the number of rehabilitation programmes proposed and not directly to the number of respondents.

Figure 6.6: Type of payment system drawn on per phase in the rehabilitation process – Amputation of Lower Extremity

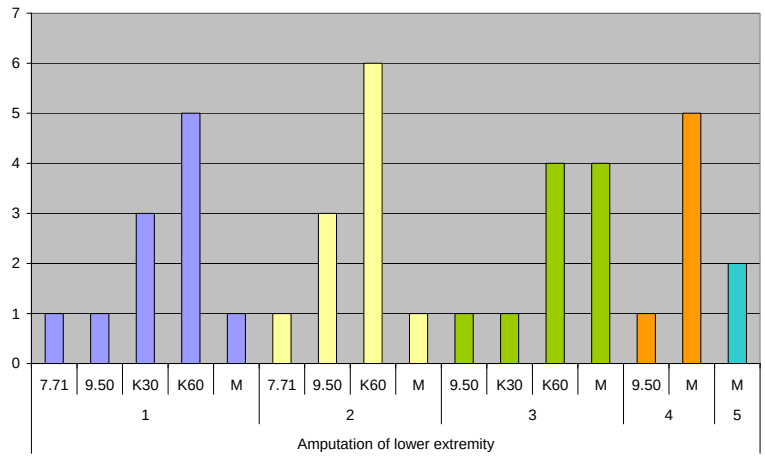


Figure 6.7: Type of payment system drawn on per phase in the rehabilitation process – Stroke

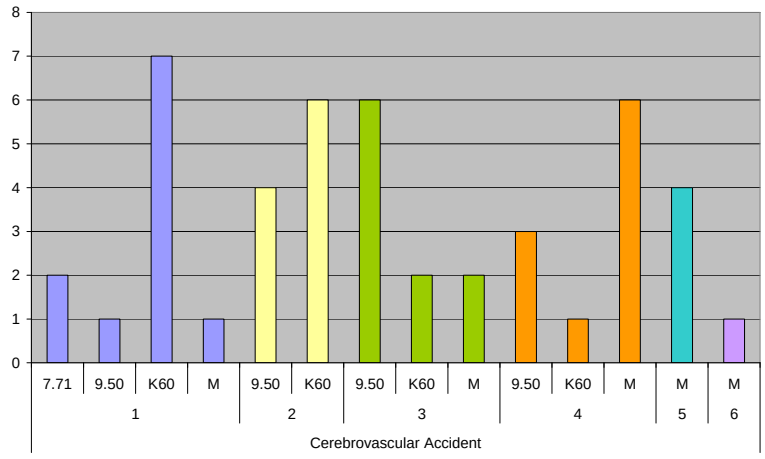


Figure 6.8: Type of payment system drawn on per phase in the rehabilitation process – Multiple Sclerosis

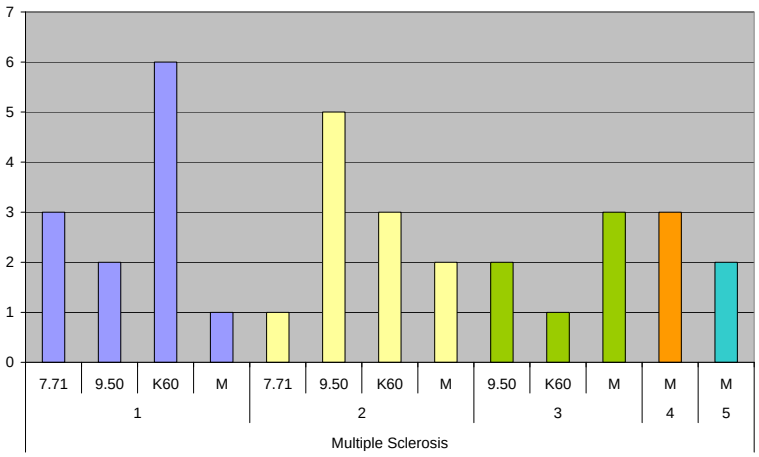


Figure 6.9: Type of payment system drawn on per phase in the rehabilitation process – Spinal Cord Injury

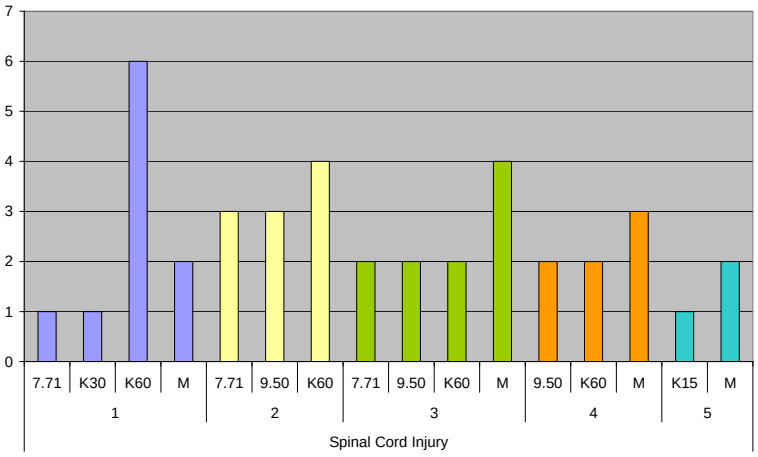
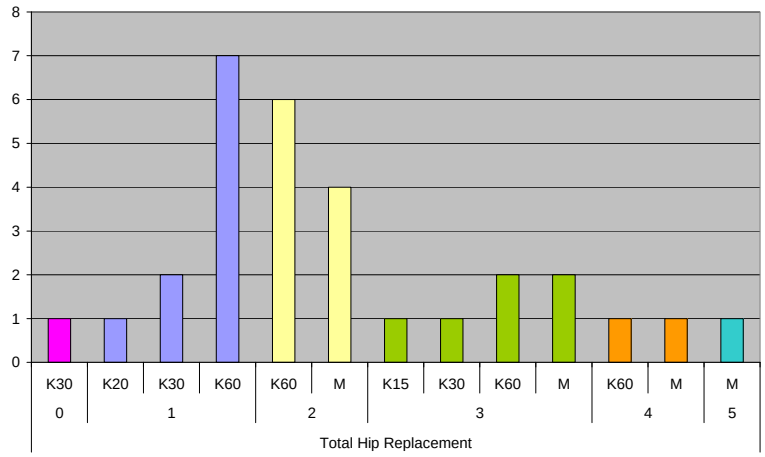


Figure 6.10: Type of payment system drawn on per phase in the rehabilitation process – Total Hip Replacement



Key points

- **Most of the practitioners preferred to charge a K60 in the first phase(-s) for each of the five patient cases.**
- **However, for each of the five patient cases there is a large variability in payment systems applied per phase. Probably a part of the variability can be explained by the fact that the access to some payment systems is reserved for specific rehabilitation organizations (For more detailed information on this issue see chapter 5).**

6.3.1.4 Treatment packages identified by payment systems in terms of percentage of the complete rehabilitation process

Each of the next graphs represents payment system in terms of percentage of the complete rehabilitation process.

The values on the X-axis are explained under "Notifications" (see 6.3.1). On the Y-axis, payment systems are reflected in terms of percentages of the complete rehabilitation process. The rehabilitation process in total represents 100%.

Figure 6.11: Treatment packages identified by payment systems in terms of percentage of the complete rehabilitation process – Amputation of Lower Extremity

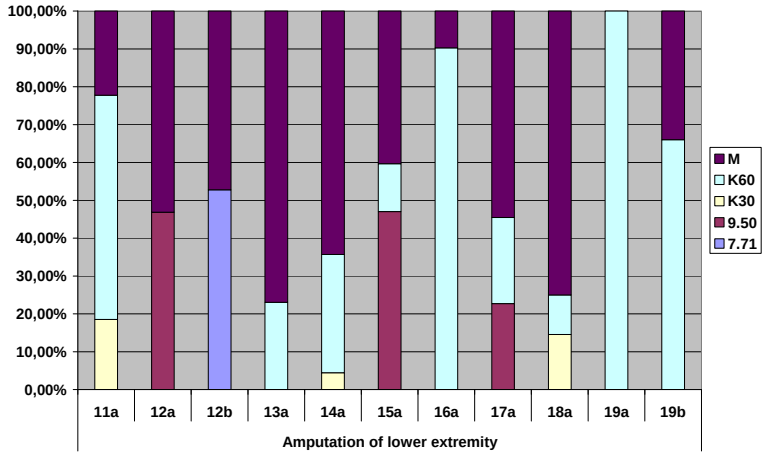


Figure 6.12: Treatment packages identified by payment systems in terms of percentage of the complete rehabilitation process – Stroke

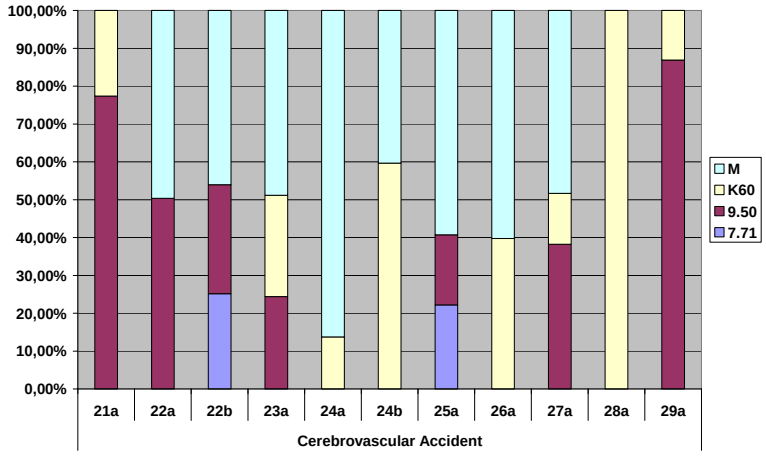


Figure 6.13: Treatment packages identified by payment systems in terms of percentage of the complete rehabilitation process – Multiple Sclerosis

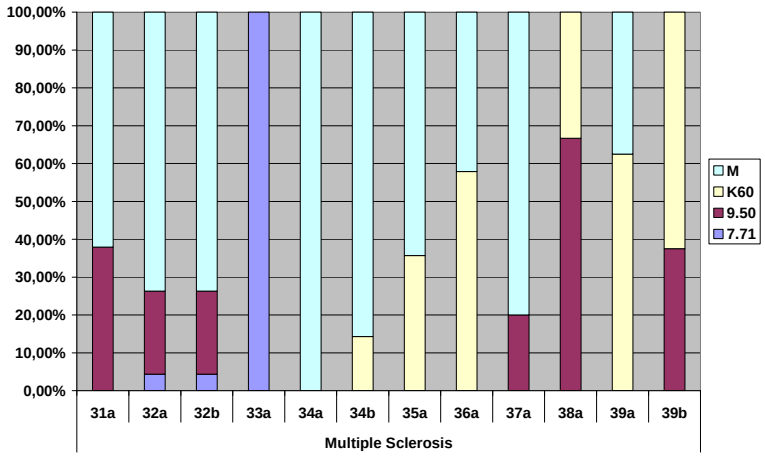


Figure 6.14: Treatment packages identified by payment systems in terms of percentage of the complete rehabilitation process – Spinal Cord Injury

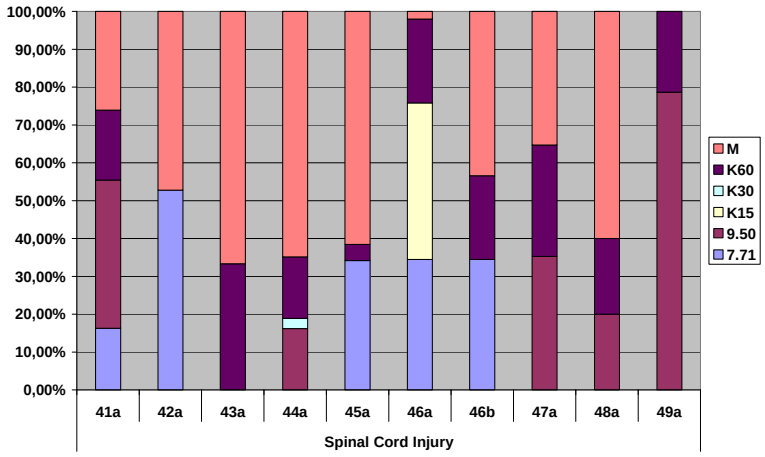
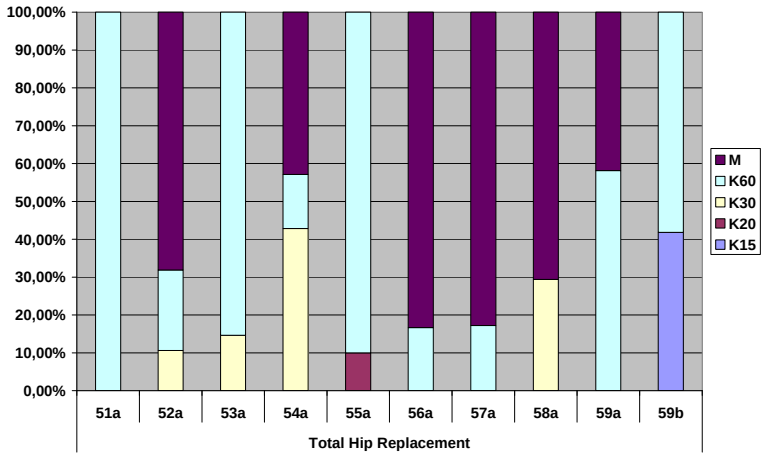


Figure 6.15: Treatment packages identified by payment systems in terms of percentage of the complete rehabilitation process – Total Hip Replacement



Key points

- **Between the different respondents, there is a large difference in use of mono- (M, K15 and K20) versus multidisciplinary treatment (K30, K60, convention 9.50, convention 7.71). The contribution of the payment systems differs accordingly.**
- **For all described patient cases, except for total hip replacement, every single payment modality (M, K, convention 9.50, convention 7.71) seems to be under consideration at least once during the rehabilitation process.**

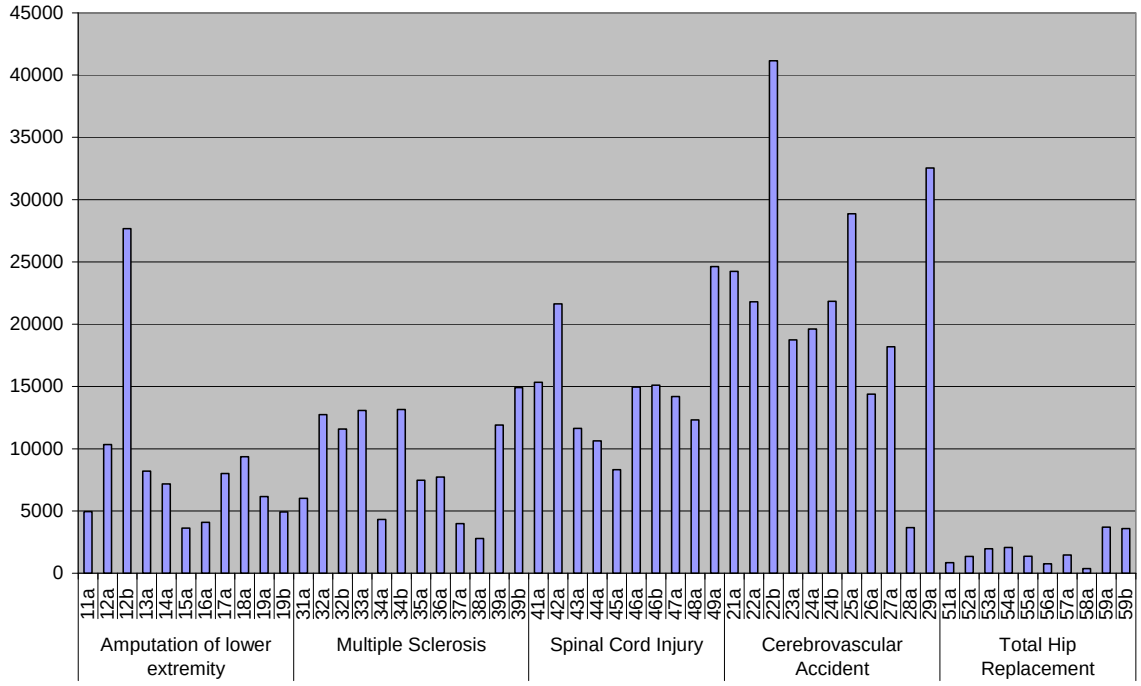
6.3.1.5 Reimbursement for each optional rehabilitation programme per patient case

Because the number of sessions and the used payment systems differ between rehabilitation organisations a difference in reimbursement per optional rehabilitation programme per patient case is expected. For the calculation of the reimbursement see "Notifications" (see 6.3.1).

The next graph shows possible reimbursements of a rehabilitation programme for the five patient cases.

On the X-axis the patient cases are classified by underlying pathology as well as the optional rehabilitation programmes. On the Y-axis the reimbursement (Euro) is represented.

Figure 6.16: Reimbursement for each optional rehabilitation programme per patient case



The reimbursement of possible rehabilitation programmes differs per patient case. It would be interesting to have quality and outcome indicators available to check if differences in number of sessions, differences in payment systems and as a consequence differences in reimbursement, induce a difference in quality of care and outcome.

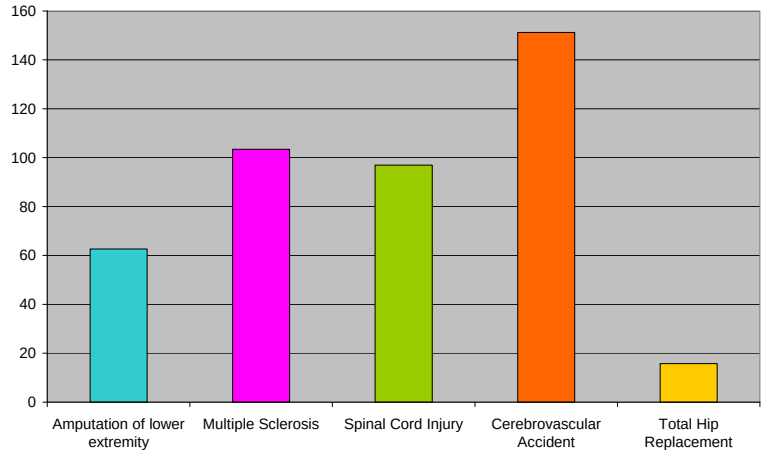
Rehabilitation after stroke seems to be the most expensive of the five selected pathologies, whereas rehabilitation after total hip replacement seems to be the least expensive. Spinal cord, multiple sclerosis and amputation of lower extremity are situated in-between.

6.3.1.6 Average number of sessions per patient case

The next graph shows the average number of sessions per patient case. The number of optional rehabilitation programmes differs between the patient cases because some respondents described more options per patient case then others. In case of more optional programmes, the total number of rehabilitation sessions might be higher.

The X-axis represents the five patient cases. The Y-axis represents the average number of sessions per case.

Figure 6.17: Average number of sessions per patient case

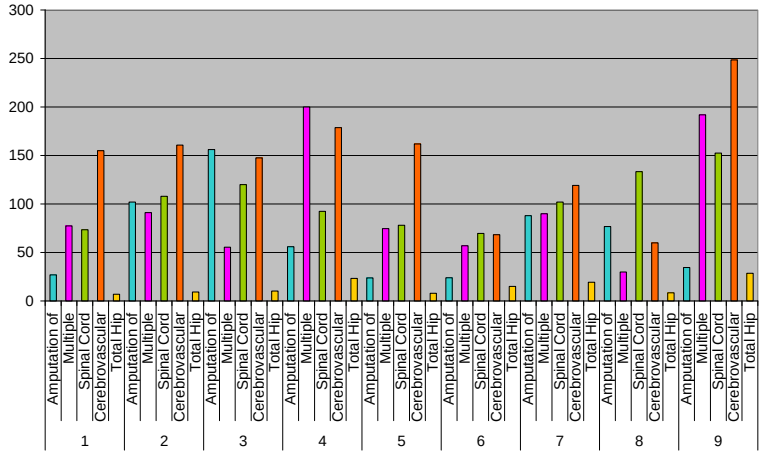


Most of the rehabilitation sessions are provided to an individual after stroke or spinal cord injury or to the individual with multiple sclerosis rather then to individuals after amputation of a lower extremity or a total hip replacement, which seems logical when the complexity and the chronic character of the consequences of the different pathologies is considered.

In order to detect trends in the number of sessions per respondent a graph reflecting the average number of sessions per patient case per respondent completes the analysis. No outliers are detected though.

Figure 6.18: Average number of sessions per patient case per respondent

6.3.2 Optimised rehabilitation programmes



A second part of the questionnaire asks the respondents to describe ideas for optimising rehabilitation programmes for each of the five patient cases, independent of their own working situation, the current payment systems and the Belgian organisation model. Concrete recommendations, such as included in a report of the GTA (Greater Toronto Area) Rehab Network [137], (see chapter 3.5.1) were hoped for. In that report recommendations were made for patients after hip replacements such as:

- Standardize the model of care to achieve equitable access to best care;
- Identify and track appropriate outcome measures;
- Develop appropriate triage tools;

- Improve the quality and quantity of available hip replacement data.

However, every respondent formulated recommendations at the individual patient level or 'micro'-recommendations instead of more general or 'macro'-recommendations. Most of these recommendations are still dominated by the characteristics of the current payment systems and organisation.

A synthesis of the recommendations has been made.

6.3.2.1 Spinal Cord injury (SCI)

Acute care unit

- Stay as short as possible;
- Stay until medical stabilisation;
- Acute care unit must be specialised in spinal cord lesions;
- Rehabilitation (physical therapy, occupational therapy) can start in this unit.
- As soon as possible transfer to a rehabilitation organisation for a multi-disciplinary rehabilitation programme.

Reference organisation specialised in spinal cord injuries

- Multidisciplinary rehabilitation programme
- One price per medical team for multidisciplinary interventions (neurologist, orthopaedist, physiatrist, urologist, …).
- The physiatrist is the coordinator during the stay in a rehabilitation organisation.
- ADL-training, mapping of required equipment, sphincter training, …

General rehabilitation organisation

When the individual can perform transfers, is independent for ADL and adaptations at home are performed, outpatient rehabilitation in the rehabilitation organisation can start.

When functioning at home is without problems, rehabilitation at home can start.

Rehabilitation at home

- Physical therapy

6.3.2.2 Stroke

Acute care unit

- Start multidisciplinary rehabilitation programme

Rehabilitation organisation specialised in stroke or non-congenital cerebral lesions

- Continue the multidisciplinary rehabilitation programme

After six months of rehabilitation in a rehabilitation organisation specialised in stroke or non-congenital cerebral lesions, an assessment of dependence must be performed. Depending on the results of the assessment the patient can stay in the specialised organisation or can be transferred to a general rehabilitation organisation.

General rehabilitation organisation

Duration of the stay in a rehabilitation organisation depends on the level of recovery and the social situation. If there is recovery of function and difficulties concerning social situation exist, early transfer to a nursing home with maintenance physical therapy is

preferred. If recovery and/or acceptable social situation are present, the duration of the stay in a rehabilitation organisation is by preference 3 months but can be prolonged.

Rehabilitation at home

- Physical therapy + Speech therapy.

Payment related to the patients' characteristics.

6.3.2.3 *Multiple Sclerosis (MS)*

Therapy planning is performed during a short stay in a "categoral" rehabilitation organisation.

Multidisciplinary medical follow-up (neurologist, physiatrist, urologist, …).

Only in case of complication or relapse, a short stay in a rehabilitation organisation for intensification of the rehabilitation programme is essential. In all the other cases outpatient rehabilitation in a rehabilitation organisation or at home is preferred.

Rehabilitation "categoral" organisation (Inpatient/Outpatient depending on the geographical situation)

Locoregional rehabilitation organisation

Rehabilitation at home: physical therapy + speech therapy

Maintenance physical therapy

6.3.2.4 *Lower Extremity Amputation (LEA)*

Start production of prosthesis 15 – 21 days after amputation.

Rehabilitation "reference" organisation with a technical department for rehabilitation equipment OR IF older patient or patient without professional occupations THEN locoregional rehabilitation organisation

- An inpatient rehabilitation during the first 8 – 12 weeks seems less fatiguing and more efficient than an outpatient rehabilitation.
  - ⇔ Admission as short as possible (only: ADL-training, handling and adapting the prosthesis, preparation of home care).
- During the inpatient phase social reintegration must be prepared.
- Admission in an rehabilitation organisation where a surgeon, a reconstructive surgeon, paramedics, orthopaedic technicians, … are available.
- As soon as the patient is independent for ADL: monodisciplinary rehabilitation at home.

Rehabilitation at home

- Physical therapy

6.3.2.5 *Total Hip Replacement (THR)*

Before the intervention informative lessons and exercises must be provided.

Acute care unit

- After surgical intervention progressively start physical therapy.

Department for physical medicine and rehabilitation

- Physical therapy + Occupational therapy (maximum one month).
- Length of stay depends on the social situation.

Rehabilitation at home

- Physical therapy (maximum 3 months).

6.4 CONCLUSION

A large variability in current rehabilitation programmes appears per patient case. A link to the type of rehabilitation organisation was not made in order to guarantee the anonymity of the respondents. Duration of therapy was very different between respondents. Furthermore, for all but one case every possible payment system was suggested at least once in the proposed rehabilitation programmes. This accentuates the overlap, related to accessibility as well as content, between the different payment systems as described in chapter 5. Possibly the variability can be explained by a lack of criteria permitting a uniform interpretation of the individuals' needs. Another possibility is that the variability in rehabilitation programmes is related to the preferences of the practitioner and to the accessibility of payment systems which differs between rehabilitation organisations. Important is the remark that it is not known whether this variability induces differences in quality and/or outcome. In Belgium, as in many other Western countries, there is no systematic registration of quality and outcome information.

Concerning the propositions to optimise rehabilitation programmes independent of the own working situation, the current payment systems and the Belgian organisation model, only recommendations at the level of an individual patient were given comparable to the content of a clinical pathway. Another important fact is that most recommendations still seem inspired by the characteristics of the current payment systems and organisation model.

Key points

- **A small exploratory survey shows a large variability in current rehabilitation practice in Belgium for five patient cases (LEA, MS, SCI, stroke and THR).**
- **The variability concerns duration of the rehabilitation programmes (expressed as a number of treatment sessions), type of therapy (mono- versus multidisciplinary) as well as payment system (M- or K-nomenclature, 9.50 or 7.71 convention).**
- **Rehabilitation organisations have a different access to payment systems.**
- **The variability in rehabilitation programmes is probably rather explained by the type of rehabilitation organisation (and associated financing system) locally available, and not by patient's rehabilitation needs and goals. Except for medical diagnosis, no patient referral criteria are available.**
- **Quality and outcome parameters, measuring the impact of the variability in clinical practice are not registered systematically.**
- **Recommendations of practitioners for optimising rehabilitation programmes are mostly inspired by the characteristics of the current payment system and organisation model.**
- **Most practitioners recommend different steps in the organisational setting (e.g. acute setting, specialised centres, general centres, home care), thus subscribing a network of organisations.**

7 CLINICAL PATHWAYS FOR REHABILITATION

7.1 INTRODUCTION

A limited research on rehabilitation practice in Belgium (See chapter 6) indicated that a large variability is possible related to intensity and duration of therapy for patients with comparable characteristics. An additional question to find out whether this variability is also represented in the currently used clinical pathways, was formulated. The goal of this chapter was an identification and comparison of clinical pathways for rehabilitation after amputation of lower extremity, multiple sclerosis, spinal cord injury, stroke and total hip replacement. Guidelines and the results of randomised clinical trials were considered as out of scope for this chapter, as they are not necessarily reflected in clinical practice.

Due to a lack of scientific reports containing evidence to support all clinical decisions in rehabilitation, the content of a clinical pathway is often influenced by the opinion of stakeholders and the financing and organisational aspects of the health care system in a country. A comparison of clinical pathways developed in different countries, might neutralise these influences and might result in a more neutral description of the 'optimal' clinical pathway.

At a macroscopic level, the clinical pathways can be used to discuss current variability in rehabilitation practice in Belgium. Besides, these clinical pathways can be used to argue certain choices related to the future supply of rehabilitation services.

This chapter was performed by a collaboration between the "Centrum voor Ziekenhuis- en Verplegingswetenschap, Leuven" (CZV) and the department of Physical Medicine and Rehabilitation, Leuven (PMR).

The CZV offered an introduction course on clinical pathways and continuous support during this (sub-)project. The CZV provided a network of contacts concerned with the development of clinical pathways, in different countries.

PMR composed a team of residents of Physical Medicine and Rehabilitation.

Clinical pathways were searched, analysed and compared by use of a general template (Figure 7.1) in which the most relevant parameters were integrated. It was not the objective to analyse the type of interventions in detail.

Figure 7.1: Template for analysis and comparison of clinical pathways

General information of the clinical pathway			
Search algorithm			
Source (Website/Journal)			
Title			
Author			
Publication year			
Pathology			
Origin (Country/City/Hospital/Institute/Organisation/...)			
Objective (Clinical practice/Resource allocation/…)			
Method used in the development of the clinical pathway			
Focus on outcome/Focus on process * Focus on outcome: Tasks depend on outcomes * Focus on process: Tasks depend on delay, availability of resources, ...			
Content of the clinical pathway			
Phase …	Delay after onset pathology		
	Method of identification of patient needs		
	Conditions to start this phase		
	Acute care/Post-acute care/Maintenance		
	Inpatient/Outpatient		
	Mono-/Multidisciplinary		
	Involved professionals		
	Type of therapy (physical therapy, vocational therapy, …)		
	Intensity of therapy (X Hours/Day/Week)		
	Expected outcomes		
	End of phase	Method of outcome measurement	
		Conditions to end this phase	
		Length of phase	
Phase …	Delay after onset pathology		
	Method of identification of patient needs		
	Conditions to start this phase		
	Acute care/Post-acute care/Maintenance		
	Inpatient/Outpatient		
	Mono-/Multidisciplinary		
	Involved professionals		
	Type of therapy (physical therapy, vocational therapy, …)		
	Intensity of therapy		
	Expected outcomes		
	End of phase	Method of outcome measurement	
		Conditions to end this phase	
		Length of phase	

7.2 LOWER EXTREMITY AMPUTATION (LEA)

7.2.1 Methodology

The literature for rehabilitation pathways after LEA was explored.

First examples of pathways were searched on the website of evidence based medicine of KU Leuven.

There was a link to the website www.consorta.com. The combinations "clinical pathway and amputation", "clinical pathway and amputee", "critical pathway and amputation" and "critical pathway and amputee", were searched. No results were found.

The website of NHS in the U.K. [v] was searched on the topic: "Protocols and Care pathways". Under the heading "Clinical Department" one reference to "amputation leg" was found. This clinical pathway was included. But the authors remarked that the document does not allow for Care Pathway Variance recording. The origin of the

[v] www.library.nhs.uk

pathway is UK, West Yorkshire, Keighley, Airedale General Hospital. The year of publication was not traced.

The website of the American Association of Physical Medicine and Rehabilitation (www.aapmr.org) was consulted and 7 articles in the period 2000-2006 were found. We excluded 2 articles by abstract and read 5 articles in full text. We only kept 1 clinical pathway as relevant.

The Pubmed database was searched with the keywords critical pathways, integrated care pathway, amputation, amputees and rehabilitation. (See Appendix to chapter 7)

The Cinahl database was searched using the keywords amputation care, critical path, amputation stumps, below knee amputation and above knee amputation. (See Appendix to chapter 7)

International experts were contacted on this topic (See Appendix to chapter 7). Two reactions were received which seemed useful. It concerned only one real clinical pathway. The other one concerned a theoretical protocol.

One clinical pathway was received via the CZV (Centrum voor Ziekenhuis- en Verplegingswetenschap, Leuven). The origin is the Shangi General Hospital, Shangai .

All these search algorithms were double checked by a second reader to avoid a selection bias.

7.2.2 Results

Four existing critical pathways concerning rehabilitation of patients who had an amputation of the lower extremity, above or below the knee, were selected.

Origin	Country	Number of pathways
Europe	United Kingdom	1
	Belgium	1
America	USA	1
Asia	Shangai	1

7.2.2.1 Patient characteristics

All these pathways concerned planned amputations on a vascular basis, and therefore can not be used for traumatic amputees.

7.2.2.2 Delay after LEA

All pathways start in the pre-operative phase, when the decision for amputation is made. For this phase, there are almost no differences between the different pathways.

The day of the intervention is only in one path considered as part of the post-acute phase.

One pathway indicates that rehabilitation therapy starts at the day after surgery, in two other pathways on day two after surgery. In the other pathway no concrete timing is given.

The maintenance phase after therapy starts in the week following surgery (2 pathways), depending on the progression (criteria are discussed in detail in the Appendix) (1 pathway), or is not explicitly described (1 pathway).

7.2.2.3 Method of identification of patient needs

Patients' needs are determined by a multidisciplinary team and comprise medical assessment, level of amputation and premorbid lifestyle, performed. The medical assessment includes a physical examination and evaluation of the mental state. No further detail on the eventual use of standardised assessment instruments is given.

An assessment is performed in the pre-operative phase. In the other phases no assessments are mentioned.

7.2.2.4 *Conditions to start rehabilitation*

The start of the pre-operative phase is related to the planning of an amputation of the lower extremity.

The start of the post-operative phase depends on the patient's physical evolution, wound healing, stump-modelling, three points march, motivation and cooperation, as mentioned in one pathway.

The follow-up factors during all phases of rehabilitation are pain control and a good physical status (criteria not described in detail).

7.2.2.5 *Duration of rehabilitation*

In one pathway the post-operative phase is continued until the day of discharge, 4 weeks after surgery. The pathway stops at the day of discharge.

In one pathway, the different phases are based on the patients' progression (criteria for patient progression are described in the Appendix). The pathway is divided in a pre-prosthetic training, a prosthetic training and the community integration. A long term follow-up is foreseen until 18 months after surgery.

The other pathways contain no exact numbers of days or weeks of each phase following surgery.

7.2.2.6 *Involved professionals*

All rehabilitation programs are organised by a multidisciplinary team. This team includes:

- Physicians: orthopaedic (all pathways) and vascular surgeons (all pathways), physical therapist (all pathways) and anaesthesiologist (only 1 pathway in the pre-operative phase);
- Nurses (all pathways); one pathway refers to the involvement of a nurse specialised in diabetes mellitus;
- Physical therapist and occupational therapist (all pathways);
- Recreational therapist (one pathway);
- Social worker (three pathways);
- Dietician (two pathways);
- Podiatrist (one pathway).

No distinction between the different phases is made related to team composition.

In one pathway the supply of a physio-amputee school is foreseen.

7.2.2.7 *Intensity of therapy*

All rehabilitation programmes foresee physical therapy once a day during inpatient rehabilitation. Concerning outpatient rehabilitation no intensity of therapy is discussed.

7.2.2.8 *Type of therapy*

During the pre-operative phase, all pathways include informing patients and their relatives, in an inpatient setting.

The care on the day of intervention is focused on monitoring the physical status of the patient and wound healing.

In all pathways, physical and occupational therapy is starting in the post-operative phase, in an inpatient setting. One pathway mentions rehabilitation therapy activities performed by nurses.

All post-acute and maintenance phases contain pain control, stump modelling and march training as most important goals. A multidisciplinary team is taking care of the medical and paramedical follow-up.

The phases after the post-operative phase are performed in an inpatient and/or an outpatient setting.

7.2.2.9 Expected outcomes and the use of outcome measurement tools

The main outcome for the pre-amputation phase is having an informed and well-prepared patient, who is fit for surgery.

On the day of the intervention, all critical pathways include pain control and stump modelling as the main goals. Patient's physical and mental status are continuously monitored.

One program indicates that day of discharge may depend on wound-healing and stump status. Another pathway lets the day of discharge depend on the patient's progression based on a physical assessment.

7.2.3 Conclusion

In literature, many descriptions of the use clinical pathways or rehabilitation programs for lower extremity amputations, were detected. Only four pathways were obtained for analysis and comparison.

All pathways start in the pre-operative phase. All pathways make use of a multidisciplinary team, consisting in all programs of physicians, physical therapists, occupational therapists and nurses. Social workers and dieticians are also team-members, but not in all pathways. Physical therapy is given daily during inpatient rehabilitation, but the exact amount of time of therapy is not explicitly noted in all pathways.

The duration and content of the rehabilitation process described in the 4 clinical pathways differs. But this can be explained by the fact that each pathway only covers a part of the disease trajectory. Acute, post-acute and maintenance post-acute phases differ between the 4 pathways, as do the outcome measurements. Only 1 program included long-term follow-up until 18 months post-operatively. In only 1 pathway, prosthetic training is included, without giving concrete details. In the other 3 pathways, there is no report on prosthetic training or adaptation of prostheses. Perhaps, they only provide the prosthetic training in an outpatient setting.

7.3 MULTIPLE SCLEROSIS (MS)

7.3.1 Methodology

The objective of the search was to find clinical pathways for rehabilitation in case of multiple sclerosis, used in different countries.

The search algorithm on the website of the American Academy of Physical Medicine and Rehabilitation was performed by the subheadings Legislative, Business and Clinical Pathways and Multiple Sclerosis (N=23).

In the PubMed search the keywords rehabilitation, multiple sclerosis, critical pathway, clinical pathway, integrated care pathway and care map were used. (See Appendix to chapter 7)

Cochrane library search algorithms contained the keywords clinical care pathway, multiple sclerosis, critical care pathway and care pathway. (See Appendix to chapter 7)

Search on the website of the national library of health of the U.K. was performed through 'protocols & care pathways' and 'multiple sclerosis' (N=0).

Different experts were contacted to ask whether they had a clinical pathway for rehabilitation in multiple sclerosis, and were willing to provide it. E-mail addresses were obtained trough the publications found by the literature search (N=9), through the website of RIMS (rehabilitation of multiple sclerosis - Europe) (N=22), the website of the department of health of the UK (N=3), and through the website of the National multiple sclerosis society of the USA (N=1). Personal contact with professionals in Belgium took place (N=1).

Results of the searches were screened by title and/or abstract. The search algorithms were double checked by a second reader to avoid selection bias, and results were discussed with professionals of the CZVand department of PMR.

7.3.2 Results

During the search on the website of the American Academy of Physical Medicine and Rehabilitation, 4 publications (see Appendix to chapter 7) were considered as relevant. Full text of all articles was scanned.

In the PubMed search 7 articles (see Appendix to chapter 7) were identified as relevant. Full text of all articles was scanned.

In the Cochrane library and on the website of the national library of health in the U.K., no relevant publications were detected.

Through contact with professionals, both by e-mail or personal contact, only 2 clinical pathways for rehabilitation for multiple sclerosis were received.

Only the two clinical pathways obtained via expert contact were apt to be analysed and compared.

7.3.2.1 Patient characteristics

Both pathways describe a multidisciplinary path for inpatients, for acute/post-acute or maintenance therapy.

7.3.2.2 Delay after onset of MS

Delay after onset of pathology wasn't described in either of them.

7.3.2.3 Method of identification of patient needs

The pathways are different related to the methods of identification of patient needs; one pathway uses a psychological questionnaire, composed by the local team members, concerning expectations/satisfaction. The other uses functional tests (Barthel, FIM, ESS) and consultation of the patient to discuss feasible objectives.

7.3.2.4 Conditions to start rehabilitation

Conditions to start the clinical pathway were rather functional in one pathway (identification of areas of potential functional improvement involving 2 or more disciplines, patients must be able to undertake an intensive therapy, definition of a clearly defined set of functional objectives which aim at reducing their degree of disability and/or handicap), and rather time-based in the other (minimum 3 weeks of admission).

7.3.2.5 Duration of rehabilitation

Length of stay was 3 weeks, and every single week was described separately in both clinical pathways.

7.3.2.6 Involved professionals

A difference between both paths is also that the medical staff consists of a neurologist and a specialist in physical medicine and rehabilitation in one; in the other, they only mentioned the involvement of a neurologist. Apart from this difference, involved professionals are similar.

Concerning the controlling system (signing of joint procedures,…) of the pathways, solutions of both described pathways are also different: by developing the first pathway, it was felt appropriate to introduce a key-worker system, with the key-worker acting as the coordinator for the patient's clinical pathway. The other pathway doesn't mention a control system yet, but professionals are working out a control mechanism on PC.

7.3.2.7 Intensity of therapy

Intensity of therapy was not described in one path, and varied from 2,5 up to 4 h/day in the other.

7.3.2.8 Type of therapy

Type of therapy was similar in both pathways: physical therapy, vocational therapy/occupational therapy, speech and language therapy, (neuro-)psychological and social support.

7.3.2.9 Expected outcomes and the use of outcome measurement tools

In both pathways expected outcomes were identified by setting goals, and adjusting them if needed. In one pathway, goals are set according the RAP-profile (rehabilitation activity profile), but goals were not further described in detail, in neither of the pathways.

Method of outcome measurement was described with Barthel Index, FIM and ESS in one pathway. The other path described outcome measures, only for the last phase (phase of discharge): RAP (rehabilitation activity profile)-goals and the psychological questionnaire concerning expectations/satisfaction.

7.3.3 Conclusion

Very few concrete clinical pathways for rehabilitation of multiple sclerosis were found trough literature search and contact with (inter)national experts. Few experts use a concrete clinical pathway, or are eager to communicate it.

Only two clinical pathways for rehabilitation of multiple sclerosis (Belgium – UK) were withheld and a comparison of both showed great similarity in objective and method of development. Both paths are focused on process and are patient centred, and are comparable in patient characteristics, type of therapy, length of stay and involved professionals (apart from the fact that involvement of a specialist of physical medicine and rehabilitation was described in only one path). Main differences were found in the method of identification of patients' needs, and conditions to start the pathway.

Due to extreme variability and unpredictability in multiple sclerosis, rehabilitation still seems to be mainly based on clinical experience and expert opinion.

7.4 SPINAL CORD INJURY (SCI)

7.4.1 Methodology

The objective of the search was to find clinical pathways for rehabilitation after spinal cord injury, used in different countries.

Literature search was started with a consultation of the website of the Belgian and Dutch Clinical Pathway Network [w], followed by the website of the American Academy of Physical Medicine and Rehabilitation, was followed. Twenty-five papers (1994-2002) about clinical pathways for spinal cord injury were identified. Three papers described in detail a clinical pathway for SCI for the acute phase. One of these clinical pathways started in the acute phase and went over in the post-acute phase.

The Protocols & Care Pathways Specialist Library of the NHS National Library for Health [x] were also consulted but this link did not contain any clinical pathways for SCI.

The Pubmed database was explored using the keywords critical pathway and spinal cord injuries. This search resulted in 7 publications. Two of them were relevant. (See Appendix to chapter 7)

Google was searched by the algorithm (Critical Pathway) OR (Clinical Pathway) OR (Integrated care Pathway) AND (Spinal Cord Injury). We only found one paper of interest which was included yet after consultation of the AAPM&R website.

All search algorithms were double checked by a second reader to avoid a selection bias.

After the literature search, more than 60 clinical pathway experts in different countries were contacted and asked to forward information on the content of clinical pathways for spinal cord injury (See Appendix to chapter 7). Experts were contacted in Belgium, The Netherlands, the United Kingdom, France, the US, Australia and Switzerland. Authors of the selected scientific articles were also contacted. Besides this, 36 international colleagues were contacted by the "Centrum voor Verplegings- en ziekenhuiswetenschap, Leuven". Members from ISCoS (International Spinal Cord Society), AFIGAP (Association Francophone Internationale des Groupes d'Animation de la Paraplégie) and DuFSCoS (Dutsh Flemish Spinal Cord Society) were contacted as well. At last some direct colleagues in Physical Medicine and Rehabilitation who are at work in different foreign countries, were asked for information. In total 66 emails were sent of which 21 answered (21/66). Six colleagues let us know that in their hospital no clinical pathway is used for spinal cord injury (UK, Australia, USA and Belgium). One person sent an irrelevant answer (USA). Seven colleagues referred to guidelines they use. However these guidelines are no real clinical pathways (USA, UK, Zwitserland and the Netherlands). One person referred to an interesting article which was already detected during the literature search (Prague). From New Zealand a clinical pathway "Halovest" was sent. From Switzerland (Sion) we received one clinical pathway concerning the post-acute phase after SCI. Two e-mails came from centres where the development and implementation of a clinical pathway for SCI is in progress (France, UK). One person referred to a general clinical pathway for inpatients on a neurological rehabilitation facility, not specifically for spinal cord injury.

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[w] http://www.uzleuven.be/ebm/kp

[x] http://www.library.nhs.uk/pathways/searchResults.aspx?searchText=rehabilitation&tabID=288

7.4.2 Results

Four clinical pathways for spinal cord injuries which were useful for the comparative study, were withheld. Two clinical pathways concerning the acute phase after spinal cord injury were available in literature (USA). One clinical pathway about the post-acute phase came from Switzerland. One clinical pathway started with the acute phase and went over in the post-acute phase (USA). The clinical pathways were analysed and compared.

7.4.2.1 Patient characteristics

All concerned inpatient treatment in a multidisciplinary setting. One included only non-ventilatory dependent tetraplegia, one only paraplegia, one only cervical or high thoracic SCI and one did not mention the type of SCI.

7.4.2.2 Delay after onset of SCI

Three of the pathways describing the acute phase after SCI, started immediately after onset of the lesion. One pathway describing the post-acute phase, started 5 weeks after injury. The other rehabilitation pathway did not mention time of onset after injury.

7.4.2.3 Method of identification of patient needs

Concerning the pathways limited to the acute phase of SCI, all of the patients required intensive care based on patient's type of injury and neurological status. All of the patients were monitored by technical and laboratory exams. One pathway also mentioned the use of two outcome tools, made by the interdisciplinary team itself.

Concerning the pathways focusing on the post-acute phase, discharge goals and care pathway were reviewed with patient and family.

7.4.2.4 Conditions to start rehabilitation.

One pathway mentioned medical criteria such as haemodynamic stable patient and no acute medical interventions, but also functional criteria such as the ability to sit up and participate in therapy 3 consecutive hours for 3 days.

The other pathways did not mention a condition to start.

7.4.2.5 Duration of each phase of the clinical pathway / length of stay

Concerning the pathways related to the acute phase of SCI, different phases before and after spinal stabilisation were described. Two of them specified the first 24 hours after injury in detail. One of them considered the first 5 weeks after injury. The two others did not specify time/objectives for the patient to be ready for exit of the path.

No information on duration of the whole rehabilitation programme was given.

Concerning the pathways related to the post-acute phase of SCI, one pathway described 3 different phases; delay after injury was not mentioned. The first involved preparing to sit up, and considered 30 days. The second involved sitting up and considered 53 days. The third phase involved preparing discharge and did not mention a specific length of phase. In total, length of stay was more then 85 days.

The other pathway described 4 different phases and started 5 weeks after injury. Each of these phases was continued for 6 days. In total, length of stay was 24 days.

7.4.2.6 Involved professionals

All three acute pathways considered the usual emergency team, the nutritionist and social counselling. In one pathway, the rehabilitation specialist was asked in consult. Another also asked the rehabilitation specialist in consult and treatment by a multidisciplinary rehabilitation team (physical and occupational therapist, nurse and if

necessary a speech therapist) was started. In the other pathway, only a multidisciplinary rehabilitation team was mentioned without the rehabilitation specialist One pathway also included the chaplain, the case manager, the sex therapist, the urologist and enterostomal therapist.

In both pathways describing the post-acute phase of SCI, a rehabilitation specialist, a physical therapist, an occupational therapist, a registered nurse and psychosocial counselling were involved in all the phases of the rehabilitation programme. One of the pathways mentioned the involvement of a urologist, an enterostomal therapist, an assistive technologist and a case-manager.

7.4.2.7 Intensity of therapy

Only one pathway for the post-acute phase described 2 hours of physical therapy each day, as well as academic classes 3 hours/week.

For the other pathways no intensity of therapy was mentioned.

7.4.2.8 Type of therapy

Considering the acute phase of SCI, the content of therapy was not described in case of the involvement of a multidisciplinary rehabilitation team.

Considering the post-acute phase of SCI, in one case the goals for each phase and each therapist were formulated. In another case only the goals for each phase without specifying the therapist, were formulated.

7.4.2.9 Expected outcomes and the use of outcome measurement tools

In the acute phase of SCI, an outcome measurement tool was used once, developed by the multidisciplinary team concerning prevention of skin breakdown and calories intake per day. This team also developed a checklist focusing on haemodynamic stability, respiratory system, neuro/skeletal system, skin, bowel, bladder, sleep, communication, psychosocial activity and ADL, nutrition and education. The two others did not use specific tools, though mentioned medical criteria to continue to the following phase.

In the post-acute phase of SCI, in one pathway FIM was used. To go to a next phase, the patient must score a certain amount of points for each of the criteria.

The other rehabilitation pathway contained three phases. The first phase considered the preparation to sit up. For the second phase, the expected outcome was sitting up in a chair. The third phase was finished when the patient was ready for discharge. No specific criteria or tools were mentioned.

7.4.3 Conclusion

The use of clinical pathways after SCI is widely considered as useful. In general, clinical pathways for SCI could have a number of benefits although we need to be careful with the interpretation of the results.

It appears to be a difficult task to obtain a detailed description of pathways for rehabilitation after SCI.

Search based on literature and international contacts, delivered lots of non-specific guidelines and only 4 concrete pathways. The latter were included for further analysis. Two pathways are related to the acute phase (>USA), only one is related to the post-acute phase (>Switzerland) and one is related to the acute as well as the post-acute phase (>USA).

All of the acute pathways, described the first 24 hours in detail. For the post-acute phase, no specific pattern was followed, as one described phases by time and another by functional criteria. All of the pathways included physical and occupational therapy and discharge planning from the beginning, though only one pathway described intensity of the therapy (2hours/day of physical therapy and 3hours/week academic classes) during the post-acute phase. The content of therapy was not specified. Inclusion of the

rehabilitation specialist was mentioned in two of the acute clinical pathways within the first 24 hours but in all the pathways for the post-acute phase. The use of an outcome measurement tool made by the interdisciplinary rehabilitation team itself was once mentioned. One study mentioned the use of the FIM as outcome tool. No further standardised tools were included for evaluation.

7.5 TOTAL HIP REPLACEMENT (THR)

7.5.1 Methodology

Pubmed was searched using the Mesh terms total hip replacement and critical pathway. This resulted in 29 articles, of which 15 were related to the aim of the search. The authors who described the implementation/evaluation of a clinical pathway were – if possible - contacted and asked if the pathway could be made available. No pathways were passed on.

On the website of the NHS 3 critical pathways concerning total hip replacement were detected.

A search via www.aapmr.org (terms: care pathway and orthopaedics) resulted in one relevant publication on the benchmarks of occupational therapy within orthopaedic critical pathways.

Most of the assessed critical pathways, were found through expert contact of the "Centrum voor Ziekenhuis- en Verplegingswetenschap" of Leuven. Using their contacts, two more pathways were obtained from NHS hospitals in the UK, one German pathway, two North American pathways and one Australian.

Contacts in Belgium resulted in 1 pathway for Belgium.

All the pathways were analysed for length of stay, therapies given to the patient, involved professionals and the milestones set for the patient.

7.5.2 Results

A total of 10 pathways describing rehabilitation after total hip replacement, were selected. In Figure 7.2, the geographical origin of the pathways is shown.

Figure 7.2: Geographical origin of clinical pathways for rehabilitation after total hip replacement.

Origin	Country	Number of pathways
Europe	United Kingdom	5
	Germany	1
	Belgium	1
America	USA	2
Oceania	Australia	1

7.5.2.1 Patient characteristics

The patients included in the pathways are patients who had an elective total hip replacement.

Eight acute clinical pathways are dealing with the immediate inpatient care after surgery. One pathway (from the UK) describes an inpatient rehabilitation service as well as an outpatient rehabilitation service. The Belgian pathway only considers the post-acute phase during hospitalisation. It describes the care in a rehabilitation facility after discharge from the orthopaedic ward.

7.5.2.2 Delay after THR

Six of the nine acute clinical pathways mention the start of therapy on the first day after surgery. In three pathways rehabilitation starts on the day of surgery.

One pathway describes rehabilitation in the post-acute phase after total hip replacement. No information is given on the delay after total hip replacement, it is defined as starting after discharge from the acute care setting.

7.5.2.3 Method of identification of patient needs

Eight of the ten pathways describe a pre-admission assessment of the patient. The assessment tools mentioned in one pathway are nursing assessment, fall risk assessment, thrombosis risk assessment, wound healing risk assessment, discharge risk assessment, Norton score and patient special needs assessment. Two other pathways use a questionnaire or a check list for pre-admission assessment without giving detailed information on the criteria. Seven of the nine pathways describe the involvement of a physical therapist before admission. Five out of the eight pathways have an occupational assessment as well. One pathway even describes the possibility of a pre-admission home visit.

In all pre-admission assessments the surgeon and a nurse are involved.

7.5.2.4 Conditions to start rehabilitation

Total hip replacement is the only inclusion criterion. No other in- or exclusion criteria are mentioned.

7.5.2.5 Duration of rehabilitation

The length of stay in the acute care facility (= orthopaedic ward) ranges from 3 to 11 days. The pathway with a length of stay of 3 days contains an outpatient rehabilitation service which includes a home care program with multidisciplinary rehabilitation. This program lasts 7 days.

The end of the acute phase is discharge from the acute care facility.

At discharge, all pathways mention physical therapy as an outpatient rehabilitation service. In the pathways from the UK home-based occupational therapy is also supplied if necessary. Different discharge destinations are possible. The pathways do not mention criteria for discharge to a rehabilitation centre.

One post-acute pathways starts after discharge from the orthopaedic ward. The length of stay in the rehabilitation centre varies between 23 and 40 days.

7.5.2.6 Involved professionals

Concerning the involved professionals, we conclude that all pathways contain a physical therapist. Eight of the ten pathways include occupational therapy. Other therapists mentioned are a social worker, a recreational therapist and a speech therapist.

7.5.2.7 Intensity of therapy

None of the pathways gave information on the amount of therapy in hours a day. All pathways describe daily therapy. No information is given on therapy during the weekends.

7.5.2.8 Type of therapy

All pathways contain physical therapy. Physical therapy includes mobilisation, isometric exercises and ambulating with a walking aid. Eight of the ten pathways include occupational therapy. The content of the therapy varies between pathways: supplying the necessary walking aid, ADL-assessment, kitchen assessment, stair climbing…

7.5.2.9 Expected outcomes and the use of outcome measurement tools

In Figure 7.3 a detailed overview is given of the milestones needed to be reached at discharge. In general we conclude that ambulating independently with a walking aid, be able to climb stairs and be able to perform ADL independently are the milestones needed to be achieved for discharge.

Figure 7.3: Benchmark of discharge criteria after total hip replacement

	Length of Stay	Physical Therapy discharge criteria	Occupational Therapy discharge criteria	Outpatient rehabilitation services?
Belgium	23-40	March with 1 elbow crutch March 400 m Walk stairs Active flexion, extension and abduction of hip	ADL independently Hip ergonomy	No information
Lakes US	5	Knows home exercise program Able to ambulate independently with safe gait with crutches/walker on level surface and stairs Correct total hip precautions	Proper use of ADL-equipment Self care independent Independent transfers	Discharge to appropriate level of care, with appropriate level of care
St John's US	4	No information	No information	DC: home, home care, rehabilitation centre, LTAC, ECF, home with community referral.
Germany	6	Walks partially independent Stair climbing Full weight bearing Able to perform car transfer	Not involved	Physical therapist at home
Australia	7	Ambulating independently using walking aids Able to perform safe hygiene needs	Not involved	No information
UK Airedale	6	Able to mobilise independently using appropriate walking aids Able to negotiate stairs. Understands precautions to be taken following hip replacement	Able to dress independently using appropriate aids.	Services/ aids in place to enable safe discharge to take place
Isle of Wight UK	11	No information	No information	No information
London UK	*Acute phase:* 3 (rehabilitation facility) Post-acute phase: 7 (home-based)	*Acute phase:* transfers independently bed to chair; Independently mobile with frame/elbow crutches; attempt stairs *Post-acute phase:* Mobile independent with aid, ascend and descend stairs safely with aid, able to mobilize outside home	*Acute:* not involved *Post-acute phase:* transfers independently, able to prepare a light meal	No information
Peterborough UK	7	Discharge checklist	Discharge checklist	Physical therapy
Rotherham	7	Physical therapy assessment of sitting, mobilise with elbow crutches, stair climbing	Transfers, kitchen and dressing practice.	No information

7.5.3 Conclusion

Clinical pathways in the acute phase after total hip replacement, are widely used. Most of them start with an extensive pre-admission assessment. In 8 of the 10 pathways described above, an occupational therapist as well as a physical therapist are involved. Only 2 pathways (Australia and Germany) work without an occupational therapist. The duration of daily therapy sessions is never mentioned. There is very little information available on the type of therapy in the post-acute phase. The Belgian pathway describes the post-acute phase and one pathway of the UK gives information on the home-based therapy provided by an outpatient team including a physical therapist, an occupational therapist and a nurse.

Multidisciplinary rehabilitation after total hip replacement is used world wide in the acute phase after surgery. Very little information is available on the continuation of rehabilitation programmes after discharge from the acute care facility.

7.6 STROKE

7.6.1 Methodology

A scan of the published literature was performed to collect information on clinical pathways for stroke rehabilitation.

Pubmed was searched using the MeSH terms "critical pathways", "cerebrovascular accident" and/or "rehabilitation" (N=64). Cinahl was searched using the MH terms "critical path" and "stroke patients" (N=4). The NHS Library [y] was explored for "stroke" within the category of "Protocols & Care Pathways" (N=3). The website of the American Academy of Physical Medicine and Rehabilitation was also searched on "clinical pathways" and "Cerebrovascular Accident (Stroke)" (N=43). The CVZ was asked if clinical pathways for stroke rehabilitation were available in the archives. Grey literature (Google) was searched using the keywords "managed care", "stroke" and "rehabilitation", "integrated care" and "stroke" .

7.6.2 Results

In total, 7 relevant clinical pathways were selected for further analysis (See attachment). As demonstrated in Figure 7.4, detailed description of clinical pathways was only found for pathways developed in 3 countries: UK, US and Belgium. This might influence the findings during analysis. Another important remark is the fact that, although a lot of guidelines for rehabilitation practices during the post-acute phase of stroke are published, specially clinical pathways for the acute phase of stroke were found and only two clinical pathways for the post-acute phase of stroke were found.

All pathways were developed and applied at an individual hospital level. For most pathways it was mentioned that they were developed by a multidisciplinary team consisting of physicians, nurses, physical therapists, occupational therapists, speech therapists and social workers. Evidence of best practices combined with professional standards and existing infrastructure were the basis to formulate a consensus on practice represented in the clinical pathway. Half of the pathways are process focused, half of the pathways are outcome focused.

The goals of developing clinical pathways were timely interdisciplinary coordination, reducing practice variations, quality improvement, facilitation of discharge planning, promoting cost-effective resource use and reducing length of stay.

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[y] www.library.nhs.uk/pathways/

Figure 7.4: Countries in which selected clinical pathways were developed.

ORIGIN	COUNTRY	NUMBER OF PATHWAYS
EUROPE	U.K.	4
	BELGIUM	1
AMERICA	U.S.	2

7.6.2.1 Patient characteristics

All pathways were developed for stroke patients. Five covered the acute phase of the disease trajectory. Two covered the post-acute phase.

7.6.2.2 Delay after stroke

Clinical pathways for the acute phase of stroke start on day 1 after stroke. The clinical pathway for the post-acute phase starts later because of the condition of medical and neurological stability before applying the clinical pathway.

7.6.2.3 Method of identification of patient needs

Patient needs are identified by a multidisciplinary assessment. All involved professionals performed a specific part of the assessment. In some pathways the assessment is done by use of validated outcome measures (FIM, Barthel Index, National Institute of Health Stroke Scale Measures, Duke Mobility Scale). In other pathways assessment is performed using criteria defined within the development team. In all pathways the results of the assessment are discussed with the patient as well as with his/her family.

7.6.2.4 Conditions to start rehabilitation

In the pathways for the acute phase the focus is on multidisciplinary assessment rather than on the start of therapy. Moreover, in two pathways for the acute phase no therapy is started yet. In the other pathways rehabilitation therapy is started if the need for rehabilitation could be demonstrated by the results of the assessment. For these pathways, the day on which therapy starts, ranges from 3 days to 1 week after start of the pathway. In one pathway the start of therapy differs per type of therapy: dietician treatment starts on day 1, equipment such as a wheelchair and cushions are provided on day 3, speech therapy starts on day 3 and physical as well as occupational therapy start on day 4.

In the pathways for the post-acute phase, therapy is started after the multidisciplinary assessment is finished.

7.6.2.5 Duration of rehabilitation

If mentioned, the pathways for the acute phase focused on the process, take maximum 7 days. In the pathways for the acute phase focusing on outcomes, duration depends once on the discharge outcomes reached and once on the completion of the assessment.

The duration of rehabilitation in one pathway for the post-acute phase is +/- 4 weeks, depending on the goals reached. In the other pathway for the post-acute phase which is process focused, duration of the hospital stay is estimated on 8 weeks. These 8 weeks include 4 phases each of 2 weeks.

7.6.2.6 Involved professionals

The composition of the multidisciplinary team is very comparable between all pathways. In every pathway the multidisciplinary team is consisted of:

- A physician

- A nurse
- A physical therapist
- An occupational therapist
- A speech therapist
- A dietician

This multidisciplinary team is involved during the assessment as well as during therapy.

In some pathways a psychologist is involved. In half of the pathways a social worker is involved. Only in 2 of the pathways the involvement of a specialist in rehabilitation is explicitly mentioned.

7.6.2.7 Intensity of therapy

Intensity of therapy was never mentioned.

7.6.2.8 Type of therapy

In the cases where the start of rehabilitation therapy is included in the pathway for the acute phase, it concerns always physical therapy, occupational therapy and speech therapy.

Type of therapy or involved professionals are not defined in one pathway for the post-acute phase. Instead of this, specific intervention goals in different domains are listed. An example for the domain of activities of daily living: patient has baseline skills in feeding, hygiene/grooming and dressing. This makes it easier to implement this pathway in different organisations with typical activities per type of professional. The other pathway for the post-acute phase contains specific goals directly linked to a type of professional. Goals change over the four phases. In each phase physical therapy, occupational therapy and speech therapy are offered.

7.6.2.9 Expected outcomes and the use of outcome measurement tools

Based on the results of the assessment, treatment goals are identified. In one of the pathways it was explained that goals were determined by stroke severity, number and degree of impairments, expected outcome, pre-morbid functional status, and patient/caregiver attributes or needs. For each therapeutic intervention short term goals and estimated time to achieve these goals were defined in advance.

Only in two pathways the same assessment tool is used at the beginning and at the end of the pathway.

In one pathway four categories of outcomes are identified:

- Patient discharge outcomes
- Patient clinical outcomes
- Patient satisfaction outcomes
- Final Program outcomes

Assessment of clinical outcomes is used to determine rehabilitation goals and performed by use of:

- National Institute of Health Stroke Scale Measures (Stroke deficits)
- Orpington Prognostic Scale Measures (Stroke severity)
- Barthel Index; FIM; Instrumental Activities of Daily Living (ADL)
- Fugl-Meyer; Duke Mobility Scale (Motor function)
- Geriatric depression scale (Depression)

- Medical Outcomes Study Short Form Health Survey (Health status and quality of life measure)

Assessment of discharge outcomes is done at the end of the pathway process. Discharge outcomes include criteria focusing on patient safety and continuity of care during hospitalization and the patient's ability to successfully transit to the next level of care whether it be home, rehabilitation- or skilled nursing facility. The discharge outcomes are individualised to assist the patients in achieving their highest potential. *Examples*: Patient performes bed to chair transfers, demonstrates ability to perform care at home, demonstrates understanding of risks for injury, safety measures and use of adaptive equipment.

7.6.3 Conclusion

"The earlier rehabilitation is started the better the recovery" as one of the principles of rehabilitation of stroke patients [138] is represented in existing clinical pathways. Except for two, the obtained clinical pathways concern the acute phase of stroke.

Intensity of therapy is described in none of the pathways. Duration of rehabilitation is difficult to consider because each pathway only covers a part of the disease trajectory (acute or post-acute phase).

Identification of patient's needs are always based on a multidisciplinary assessment. In some pathways this assessment is done by use of validated outcome measures. In other pathways this assessment is done by use of criteria defined within the multidisciplinary development team. The results of this assessment are used to define rehabilitation goals or to evaluate expected outcomes.

Pathways for the acute phase are very comparable related to delay after stroke, involved professionals and type of therapy.

One of the pathways for the post-acute phase is special because involved professionals and type of therapy are not integrated. Instead of this, specific intervention goals in different domains are listed. Besides, this pathway prescribes medical and neurological stabilisation before its start.

Stroke management involves the expertise of several disciplines, which can result in poor coordination or inefficiencies in patient treatment. This can be avoided by the use of clinical pathways which ensures that important areas of treatment are not overlooked and unnecessary delays are prevented.

However, the effectiveness of the use of clinical pathways could not be confirmed yet. A reason can be that the development of clinical pathways is based on the premise that patients will have predictable recovery, whereas stroke patients show considerable variability in timing, nature, and order of recovery. Other explanations can be the dependence on external influences such as accommodation and personal support. [139]

Anyway, there is currently insufficient supporting evidence to justify the routine implementation of care pathways for acute stroke management or stroke rehabilitation. [140]

Key points

- **There are only few clinical pathways available for rehabilitation of lower extremity amputation, multiple sclerosis and spinal cord injury.**
- **A lot of clinical pathways exist for rehabilitation of total hip replacement and stroke, but they are mostly limited to the acute phase of the disease trajectory.**
- **Characteristics of the available pathways are:**

Only part of the disease trajectory is covered and there is no information about duration of the whole rehabilitation process;

Intensity and content of therapy are mostly not mentioned;

The involvement of a multidisciplinary team is nearly always mentioned;

Outcome measures are not commonly used;

Some pathways focus on outcome criteria, other focus on time-related steps of the rehabilitation process;

- **The selected clinical pathways are difficult to compare. Variability can not be confirmed nor rejected.**

8 INTERNATIONAL COMPARISON

8.1 GENERAL INTRODUCTION

This part of the research focuses on a search for international experiences with the reorganisation of the rehabilitation sector. As rehabilitation is organized differently for children and adolescents (age <17 years) and for adults (age >17 years), we focus on the adults.

The aim of this chapter is to describe experiences in the (policy) choices made in organising the musculosceletal and neurological rehabilitation in a selection of countries. The organisation of any health care sector has to be understood in general, against the background of historical policy choices. Within the practical constraints of this research, the study contextualises the organisation of the rehabilitation sector within the overall health care system. Rehabilitation approaches develop within the features of insurance models, competency domains of central and decentralised agencies and local problems of health care provision.

8.1.1 Research questions in this part of the study

- How does a selected sample of countries organise and finance (post-acute) musculoskeletal and neurological rehabilitation?
- What are the current health service debates and organisation models proposed and developed for the post-acute musculoskeletal and neurological rehabilitation sector?
- Are there any specific quality initiatives taken related to the organisation of the post-acute musculoskeletal and neurological rehabilitation sector?
- Can anything be learned about the organisational choices made in different countries for the current Belgian debate on post-acute musculoskeletal and neurological rehabilitation?
- What choices are made for some of the selected pathology groups?

8.2 METHODS

8.2.1 Selection of the countries

Of course, the practical constraints of the research limited the number of countries to be compared. The selection of the countries, was based on criteria related to the health care system, developments in the rehabilitation sector, previous research experience in rehabilitation and an endorsement of the selection by the external expert group.

Countries were selected based on the role of the state, the role and model of health insurances (private, public, mixed models) and knowledge about ongoing debates in the reorganisation of the rehabilitation sector. A selection was made of countries developing their health systems in a more North European tradition, a more south-European tradition, and countries in which insurers are taking over an important role as catalysts in the organisation of health services

A decision was made to focus on a description of the rehabilitation sector in: The Netherlands, France, Sweden, Germany and the US.

8.2.2 Peer-reviewed journals

A first step, aiming at describing the organizational models of rehabilitation for the selected countries, consisted of searching the Medline database (through PubMed).

A general search was done the last trimester of 2005 and the first trimester of 2006 using the related meshterms:

"Organization and Administration"[MeSH] OR "Professional Review Organizations"[MeSH] OR "Organizations, Nonprofit"[MeSH] OR "Health Planning Organizations"[MeSH] OR "Health Maintenance Organizations"[MeSH] OR "Health Care Economics and Organizations"[MeSH] OR "Managed Care Programs"[MeSH] OR "Risk Adjustment"[MeSH] OR "Organizational Case Studies"[MeSH] OR "Health Expenditures"[MeSH] OR "European Union"[MeSH])

AND

("Rehabilitation"[MeSH] OR "rehabilitation"[Subheading] OR "Rehabilitation Nursing"[MeSH] OR "Rehabilitation Centers"[MeSH] OR "Rehabilitation of Speech and Language Disorders"[MeSH] OR "Rehabilitation, Vocational"[MeSH] OR "Activities of Daily Living"[MeSH] OR "Treatment Outcome"[MeSH])

For each country a more specific search was done introducing search terms for multiple sclerosis, spinal cord injury, total hip replacement, stroke and lower extremity amputation (see Appendix to chapter 8).

8.2.3 Comments

Taking into account the research question (specific organisational information on the rehabilitation sector) this search strategy is not offering a lot of relevant results. The medical peer reviewed journal databases mainly focus on clinical studies, far less on specific health services studies. The MeSH terms seem not always adequate to pinpoint particular organizational or policy issues. As a result, very little information can be obtained about the organization and health services models in the selected countries. It would be of no added value to deploy "selection of evidence" tables, because the selections steps (title and abstracts) already showed that a "circumstantial" approach would be needed. All the details of this approach can be found in the Appendix to chapter 8.

For the pathology groups, some information was found resulting from a search in the medical peer reviewed databases. Again, the majority of the articles focuses on treatment and care, not organisational or policy issues. One exception to be quoted, is Germany for which more (local language) articles could be found.

An additional search in the CIRRIE-database (Center for International Rehabilitation Research Information and Exchange) gave similar results, without much added value for our particular research questions.

8.2.4 Other information sources

Factual information had to be gathered based on informal contacts within the sector, as most information in peer reviewed journals is dealing with clinical issues. Due to the lack of relevant (descriptive) information on organisational models in the peer reviewed journals, this part of the study is heavily relying on work prepared by WHO-health systems observatory (in particular the HIT-reports), a particular issue of the "journal of health economics" on the health benefits basket in different countries, on reports from professional organizations and on public information from administrative authorities. The information gathered draws also to a large extent on informal and personal communications with people (research institutes, administrators) from the countries studied.

8.3 THE NETHERLANDS

8.3.1 Health care organisation in general

The Dutch health care system is characterized by some fundamental policy changes since the end of the 1980's[141]. In general terms, and due to problems both of serving the population and of financing (cost containment), the system is trying to make the shift towards a more flexible, demand oriented and market driven model. Policy makers are less imposing the particular organization regimes, but are creating the frameworks of a welfare state in which providers and the public is offered more flexibility in using and providing health care. The system reform is often identified as a movement from a "public regulated system" towards a "regulated market model". The recent shift towards "market oriented models" implies a shift of the steering power from the public to the private sector.

The health care system changes are built on the assumption that more market forces will enable a more efficient and effective health care system, and especially a more flexible system that is able to handle the fast changing heath care needs and demands of the public. The health care system changes aim at improving the quality whilst also controlling public expenditure.

8.3.2 Health insurance

Since the mid 1990' two major insurance regimes affected the use and right to medical and social care: de ziekenfondswet (ZFW) en de Algemene Wet Bijzondere Ziektekosten (AWBZ) The ZFW and AWBZ provided for benefits in kinds, while the AWBZ also provides for cash benefits.

- Treatment and services available under ZFW are (in general terms): medical and surgical treatment (including limited number of sessions for physiotherapy and speech therapy); obstretic care, dental care, pharmaceuticals, non psychiatric hospital admissions; aids and appliances; transport, maternity care and care in an audiology centre; costs for genetic testing, haemodialysis, services for patients with chronic recurring respiratory problems, rehabilitation, and services of a thrombosis prevention unit.
- The underlying principle of AWBZ is that people should continue to live in their homes as long as possible, whether they receive care at home or in an institution: For the AWBZ seven distinct functions are defined: domestic help, personal care, nursing care, supportive guidance (helping in the organization of daily life), activating guidance, treatment, and accommodation

Since January 2006 a new, mandatory national health system, imposes individuals to purchase private health insurance. A standardized basic coverage *(Basisverzekering)* is guaranteed for all citizens by means of the Ziekte-Verzekerings-Wet (health care insurance law) (ZVW):

- Medical care, including hospitalization (up to 365 days) and specialists;
- Dental care for children (under age 18);
- Specialist dental care and dentures for adults;
- Pharmaceuticals;
- Maternity and postnatal care for up to ten days after childbirth;
- Ambulance and transportation costs; and
- Some medical and paramedical rehabilitation services.

Supplemental plans are available on an individual basis or collectively via an employer plan or similar group arrangement. Insurance companies will not be required to accept all applicants for supplemental insurance. Companies are free to determine the scope of coverage and premium levels for supplemental policies

The "wet maatschappelijke ondersteuning" (WMO) (law societal support) will replace the AWBZ .A clear separation in the overall insurance model will be made between chronic conditions and temporary conditions. The medical and paramedical parts of the AWBZ will in the future be transferred to the ZFW.[142] [143] The WMO will be mainly guaranteeing social support coordinated by the local communities.

8.3.2.1 Health care policy making and organisation

The historical changes in the Dutch health care system can be characterized as a movement towards territorial decentralization, and in the last decade a movement towards integration and coordination of the different levels of the health care providers. The Dutch system holds to a model of centralized supervision, but operational responsibilities in health and social care are delegated to the local and regional authorities.

The ministry of health, welfare and sport (VWS) sets out the health, health care and social care policies, together with the minister. Local authorities bear joint responsibility and play a complementary (local) role.

Regional networks of municipal public health services take up the care on preventive level and health promotion (among other public health tasks).

Primary care is centralized around family physicians that play a role as gatekeepers. Secondary care is mainly provided in hospitals. These hospitals have both inpatient and outpatient services. The 9 university hospitals, regionally distributed, play a role as "leading" hospitals for specialist medical interventions.

In the 1990's measures were taken to bridge the (organizational and financing) gap between outpatient and inpatient care, by means of "transmural" (integrated) care: a mechanism to coordinate and organise continuity of care for the patients. These initiatives developed as "projects", most of the time focused on specific groups of chronic patients, with intermittent acute care needs. However, the financing system did not facilitate an easy implementation of a smoothly functioning transmural (or integrated) care system.

The most important part of residential social services consists of nursing homes and homes for the elderly. Residential homes are particularly established for those people who are not able or feel unsafe to live independently at home. A distinction has to be made between somatic nursing homes (disabled people needing multidisciplinary monitoring and treatment) and psycho-geriatric nursing homes (for people with dementia).

Admissions to residential care have decreased in the last years, because of transmural initiatives (e.g. day care centres) on the care side and improvement of availability of home care services.

8.3.2.2 Financing

The hospitals were financed through a fixed budget system. The problems with waiting lists culminated in 1997 in measures making additional money available to reduce unacceptable waiting times.

In 2005 a new hospital financing system was introduced by law: the "diagnosis-treatment-combination" (Diagnose Behandel Combinaties (DBCs)), a DRG-like system describing all products and procedures provided in hospitals.[z] DBCs are defined as the whole set of activities (diagnostic and therapeutic interventions) of the hospital and medical specialists from start till discharge, using the ICD-10 classification. A patient can

[z] http://www.minvws.nl/dossiers/dbc/

enter in a DBC-trajectory by referral of his general practitioner (GP) or a medical specialist. The introduction of the DBC financing model goes hand in hand with an extended registration system.

A DBC treatment trajectory can take one day up to one year. A treatment trajectory is ended at the end of the year, in case the treatment is stopped or in case a patient starts a different dbc (e.g. the inpatient trajectory is stopped when the patient starts an ambulatory treatment; an ambulatory trajectory is then started).

DBCs distinguish between list A (prices fixed by the National Health Tariffs authority) and list B (an fixed part and a part of the prices negotiated by Sickness Funds and hospitals). DBC's are used as a framework for price negotiations between health insurers and hospitals. Agencies were created to manage the implementation and follow up of the DBC financing model [aa]

Congruent with a market driven approach, major efforts are now being put into the development of performance indicators. These performance indicators are mainly seen as a quality tool, and a facility for consumers to support informed choices on the health care market. The development of these performance indicators is still in an early stage, although a lot of debates are taking place on the conceptual level.

- **The Dutch health care system is characterized by territorial decentralisation.**
- **A market-driven approach has been introduced (purchaser-provider).**
- **Integration of care and networking of health care organisations is stimulated.**
- **The "Ziekteverzekeringswet" insures for medical expenses.**
- **The AWBZ used to insure for exceptional medical expenses and long term care.**
- **The financing of medical activities in hospitals is based on "Diagnose Behandel Combinaties", and is performance related. Extensive registration is set up.**

8.3.3 The organization of the rehabilitation sector

(See also Appendix to chapter 8 (1.8.2.2))

8.3.3.1 The underlying conceptual ideas

The Dutch rehabilitation "logic" differentiates between different levels on a continuum from "general and simple" toward "specialised and specific". In conceptual terms a differentiation is made between (a) simple rehabilitation (b) general multidisciplinary rehabilitation (c) specialized target (pathology) group oriented multidisciplinary rehabilitation and (d) highly specialized rehabilitation ("topreferente"). [bb]

For relatively "simple" rehabilitation a referral is needed from the medical specialist to the physical therapist. In the case of complex issues, a medical rehabilitation specialist becomes in charge of the patient.

A "complex" situation is generally assessed as a medical condition in which the risk of long term impairment or handicap is real. For specific cases the rehabilitation physician will mobilize a multidisciplinary team in case of discharge of the patient to a home setting.

[aa] http://www.dbconderhoud.nl/
[bb] http://www.revalidatie.nl/index_3.htm

8.3.3.2 *Rehabilitation facilities*

Rehabilitation is organized in acute hospital settings as well as in 24 Rehabilitation Centres throughout the country[cc] and a part in nursing homes. In both cases, the service can be in- or out-patient [dd]. Of the 24 Dutch Rehabilitation Centers, 14 are connected to University Hospitals ("Academiseringsovereenkomst") and have an agreement to do research and organize teaching. They are considered to be "top reference centres".[144]

24 regional rehabilitation centres and hospital departments offer specialized rehabilitation services[ee].

Most Dutch hospitals have a policlinic function for rehabilitation medicine, in which a staff of physical therapists, occupational therapist and social workers is employed. These services operate generally in close collaboration with acute intramural rehabilitation departments.

Rehabilitation hospitals/centers are established for longer term intensive rehabilitation. Their activities are falling under the "cure" compartment (ZVW). However for some categories they currently still provide rehabilitation falling under the "care" compartment (AWBZ), which is generally offered in nursing facilities.

Nursing facilities can also provide intramural and policlinical rehabilitation services. Somatic nursing homes (verpleeghuizen) are for disabled people in need of continuous multidisciplinary monitoring, care and treatment. The nursing homes aim in particular at an older population of patients, that are not eligible for a policlinical treatment or for which the intensive treatments in a rehabilitation clinic is judged as being not opportune. Moreover, the bed-capacity of the rehabilitation centres is too limited to accept this older patient group. But the rehabilitation activities in the nursing homes should also focus on reactivation. The somatic nursing homes have a multidisciplinary staff consisting of physiotherapists, occupational therapists, speech therapists and psychologists. Certain nursing homes offer policlinical services, generally focusing "day care", more than on active rehabilitation.

Recently, a lot of attention has been paid to the integration and coordination of facilities in order to provide more continuity of care for the patient ("ontschotting van de zorg") One of the most important area's in the context of this project, is the development of networks for stroke, more recently labeled as stroke services (see infra).

8.3.3.3 *Indication setting*

Patients in rehabilitation institutions need an indication setting[145] for a multidisciplinary intensive approach, (for diagnostics, advice or treatment)

The criteria used for indication setting are based on:

- the expected level of recovery;
- the multiplicity of the (expected) impairments or handicap, combined with the complexity of the rehabilitation goals put forward, taking into account the life-course stage and the premorbid level of the patient;
- the learning capacity and training capacity of the patient
- the potential of a patient to live in a regular (adapted) housing and living situation.

The indication setting is developed according to a standardized model (SAMPC (somatic) and/or RAP (mobility)), but is not using scales on a systematic basis. The indications for treatment by a rehabilitation specialist are confined to disorders of the musculoskeletal system or the nervous system (including cognition, communication and

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cc www.revalidatie.nl

dd www.dbconderhoud.nl/informatie/categoraal

ee http://www.brancherapporten.minvws.nl/object_document/o329n397.html

behaviour), that are so complex as to make specialized knowledge indispensible, or that tend to become permanent. E.g. physical rehabilitation of myocardial infarction or COPD (chronic obstructive pulmonary disease) belongs to the responsibility of the cardiologist, respectively pneumologist; in severe cases the advice of a rehabilitation specialist can be obtained. The indication has to be approved by the health insurer. Patients with complementary private insurance have (depending on the type of insurance) the right for more insured physiotherapy in private physiotherapy practices.

For the upcoming reforms, four indication categories will be distinguished for the activities falling under ZVW: (a) diagnosis, diagnostic test in complement to the initial diagnosis (b) temporary co-treatment, (c) treatment as part of a recovery trajectory (d) continuous specific care. Other categories already exist with the AWBZ framework, for which nothing will change. It has to be said that it are only proposals. Before 1 january 2007, nothing will change

8.3.3.4 Financing reforms in rehabilitation

(See also Appendix to chapter 8 (1.8.2.2))

For the rehabilitation in specialized rehabilitation centres and rehabilitation units of general hospitals, 47 DBC's [146] are in the process of being defined in 2006, but are not yet endorsed by the government. The negotiations and identification of these DBC'S are particularly difficult. It will probably be foreseen that top reference centres get a higher price for their activities. One of the debated points is also how to discount for differences in seniority or educational level of the staff.

DBC's are conceptualised as "treatment trajectories". As different rehabilitation facilities can be involved in the treatment of a patient during a rehabilitation period, the financing model funds for periods of registered activities from the DBC-lists within the facilities. It has also to be registered whether it is the first rehabilitation treatment or a "continuation" after the first treatment was ended.

7 main diagnostic categories are distinguished (locomotor apparatus, amputation, brains, neurology, spinal cord injury, organs, chronic pain and psychic disorder (and one particular DBC for multidisciplinary interaction). It should be noted that the classification into a certain DBC is only based on medical diagnosis and does not imply a functional assessment. Separate DBC's are created for polyclinical rehabilitation and rehabilitation for children. Within these head categories about 45 detailed categories are identified. The details of the activities and the subclassification is still under negotiation at this stage.

The consultations or therapeutic acts of the medical specialist are coded in 10 separate declaration categories. Each time a certain professional (speech therapist, manual therapist…) performs some activities with/for a certain patient, these are registered in a separate code. It can be "face-to-face" activities (actual treatment by physiotherapist, speech therapist, psychologist…) or "non- face-to-face" activities (such as report writing, team discussions, adaptation of a brace...) of minimal 10 minutes duration. Certain specific rehabilitation nurse acts (e.g. decubitus care) are registered by means of a therapy registration number. The activities are called "College Tarieven Gezondheidszorg-activities" as each hospital receives a yearly adjusted budget calculated on different factors. Although at the beginning of the rehabilitation episode a rough estimation of therapy duration and intensity has to be made by the rehabilitation specialist, at the end of the therapy the amount of accomplished sessions is refunded. As such, the system closely resembles a fee-for-service system.

Rehabilitation therapy has to imply a multidisciplinary (two or more therapists) setting in a rehabilitation centre. Monodisciplinary therapy can only be taken into account if it concerns a special therapy which is not available on regular basis outside the rehabilitation centre.

From 1 January 2008 onwards, the 24 rehabilitation centres will be operating according to the DBC model (be it that no negotiated part B will be implemented). Until then

they are financed in terms of reported rehabilitation treatment hours (RBU Revalidatie Behandeluren)[ff].

A model of function-oriented financing for intramural health care under AWBZ is put in place since 2005 for inpatient long term care-facilities. Providers will be financed on a budget calculation taking into account the "functions" provided (functiegerichte bekostiging) The health care policy makers try to stimulate the health care providers to take into account the particular regional needs of the population, and to develop social and health care arrangements (intramurale zorgarrangementen) combining a set of "functions" adapted to these needs. A more fundamental financing reform is prepared (to be introduced in 2007) based on the "level of care" offered (calculated on the average number of hours of care and treatment for a certain level of severity). 15 levels of care will be differentiated, and a patient will be indicated for a certain level of care.

Some aspects of rehabilitation will be taken into account in care facilities, but it will mainly be "maintenance" rehabilitation. Baskets of care ("zorgzwaartepakket") will be identified related to the characteristics and care needs of the patiënt. The care baskets differentiate between a spectrum of long term intensive support and shorter time recovery needs, but do not deal with the (para)medical aspects[147]. For each specific basket a (maximum) price will be set.[148]

8.3.4 Quality in rehabilitation

The formal procedures to develop quality assurance are since the reforms of the health care system based on "performance indicators", formal audits of the centres and quality management incentives based on registration.

Reflections started on the principles for the development of "rehabilitation treatment frameworks" (revalidatie behandelkaders: formerly identified as quality profiles). They are used as frameworks within which treatment-programmes on the level of the facilities have to be identified, The frameworks are intended as quality and accreditation instruments and try to incorporate the reflection on DBC's and performance indicators. A rehabilitation treatment framework is developed as a set of minimal conditions to be met when providing rehabilitation activities. It will be used as a tool for quality audits. Frameworks have been developed for cognitive rehabilitation, cancer rehabilitation, and rehabilitation for pain[149]. These rehabilitation frameworks have to be developed according to a standard template and follow a predefined working procedure. The frameworks currently available, only have the status of "discussion papers".

8.3.4.1 Performance indicators

The development of performance indicators of medical rehabilitation facilities is still in its early stages, and seems to be a difficult exercise.

In 2000, it was decided in a consensus meeting between stake-holders (government, insurance companies, patient organizations…) to develop performance-indicators for rehabilitation care, in order to simplify comparison between different settings for insurance companies as well as for patients.

In 2004 a so called "basic set" of performance indicators has been developed[150]. Nine dimensions were identified, along the quality lines of structure, process and outcomes: satisfaction, patient safety, effectiveness, timeliness, efficiency, transparency, collaboration, competency and competencies development and research and teaching.

In 2005 the rehabilitation institutions had to start registering on an experimental basis for these indicators. In april 2006 a first digital report has been published comparing rehabilitation facilities on the results for the basic set of indicators. The reporting is

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ff http://www.dbconderhoud.nl
www.revalidatie.nl
http://www.revalidatie.nl/pdf/dbc_special_1.pdf

aimed to communicate to the main collaborating institutions of the rehabilitation centres [144].

The aim of the quality approach is to develop and implement a set of 20 outcome measures in 2009. Some further work has to be done to further develop the system for specific patient groups. The development of the indicators is a collaborative exercise of universities, rehabilitation physicians and research units, funded by VWS.

In the framework of the development of integrated care for stroke patients (see infra) some particular propositions are made for 11 performance indicators for integrated stroke care. These indicators will be used in the "benchmark reports ketenzorg-CVA". After an evaluation of pilot-initiatives of integrated care in stroke (edisse-study), integrated stroke care was introduced in 23 dutch regions. For this new initiative, 19 indicators were used in order to assess the performance of the networks[151]. These performance indicators have yet no formal endorsement as a quality instrument.

- **The Dutch rehabilitation concept differentiates 4 levels of rehabilitation on a continuum: "general and simple" "general multi-disciplinary" "specialised and specific" and "top reference".**
- **Rehabilitation is organized in acute hospital settings as well as in 24 Rehabilitation Centres throughout the country and partly in nursing homes. Fourteen rehabilitation centres have the status of "top-reference" centre (link with universities).**
- **Patients in rehabilitation institutions need an indication setting.**
- **The rehabilitation sector will be financed in the DBC model in 2008. Until then the financing is based on an activity based model.**
- **"Function-oriented" financing for intramural health care under AWBZ is in place for inpatient long term care-facilities. A further financing reform is prepared including the "level of care" offered (calculated on the average number of hours of care and treatment for a certain level of severity).**
- **The quality approach in rehabilitation will have to fit the DBC financing and performance model. A "basic set" of performance indicators is being developed and registered. "Rehabilitation treatment frameworks" are intended as quality and accreditation instruments. They describe the set of minimal conditions to be met when providing rehabilitation activities.**

8.3.5 Example: Stroke

In recent years, a lot of "project based" attention has been paid to the organisation of facilities for people with stroke. Different pilot initiatives have been launched to guarantee better coordinated and integrated care between acute, post-acute, and home care arrangements (CVA-ketenzorg). The "Commissie CVA-Revalidatie", a working group of the "Nederlandse Hartstichting" (www.hartstichting.nl), recommended in 2001 "stroke services" (conceptualized as integration of rehabilitation activities) as the best way to take care of stroke patients, based on the opinion of the experts of the working group. Apart from the networking, they advised to assure continuity of care by transmural patient notes and/or by a transmural nurse.

The concept of stroke unit is used for a specific neurology department providing (sub)acute treatment within the hospital. On average people stay between 10-14 days. About 80% of the hospitals have such a stroke unit. 'Specialised rehabilitation stroke units' are part of rehabilitation centres, aiming at rehabilitation for independent living. The duration of stay can be up to six months. A 'nursing rehabilitation stroke unit' is a specialised department in nursing-facilities, most of the time rehabilitating people that are probably not returning home. There are only few units in each region. Some care institutions for the elderly have some specific units for elderly stroke patients. As the

Dutch system has opted for a regional approach, every region has a specialized rehabilitation unit, accepting stroke patients: there are no national reference centres.

Depending on the medical condition of the patient, there are several options for referral. In case of a hospital treatment, the first week is focusing on stabilizing the medical condition. From the second week, the multidisciplinary needs-assessment should have started. This needs assessment is the basis on which referral is prepared.[152]

An important part (about 40%) of the stroke patients admitted in the hospital is returning home. About 32% is referred (temporarily of definitive) to a nursing facility. 5-13 % of patients that stayed in a hospital is referred to a rehabilitation centre. About 20 % of this group is still in the centre after 6 months. A vast majority of the patients is referred home after the post acute phase. Some of these patients will need additional medical and care support. Another group cannot immediately be referred home and are transferred to a nursing home or rehabilitation facility for further rehabilitation. The referral is organised on a regional basis as far as possible. Some people for which no progress is expected will be transferred to nursing homes only. The rehabilitation strategy in these facilities has a different purpose. For this referral, chains of care have been identified in which the regional collaboration between different centers is stipulated. The major aim of these chains is to shorten the length of stay in acute settings, to improve the problems with waiting lists, and to realize a more cost efficient care of stroke patients.

Within the regions, regional coordination agreements (afstemmingsafspraken) are made in order to realize the chain of care model. In the EDISSE study (Evaluation of Dutch Integrated Stroke Service Experiments) [153] three experimental stroke services were analysed in depth with respect to costs, health effects, quality and organisation of care, and compared to three reference regions representing current standard care for stroke in the Netherlands. EDISSE was a non-randomised non-controlled observational study. In all "stroke service" experiments, hospitals, nursing homes, rehabilitation centres, general practitioners and home care worked together in order to provide co-ordinated care. The practical organisational design of the experiments varied considerably.) Two major problems to realise good transmural continuity of care, were waiting lists e.g. for nursing homes and on the other hand the fact that many agreements had to be made between the partners before good networking was possible.

For the particular issue of stroke it wa sobserved that all of services have professional staffmembers with specific training in stroke rehabilitation However, the rehabilitation centres can not guarantee a presence of specifically trained personnel in stroke 24-hours a day, since the rehabilitation centres are also dealing with other pathologies.

Further reflections on organisational networks and integration of care services of stroke patients have lead to the development of a methodology to benchmark the initiatives on integrated stroke care management. These initiatives hold the coordination in acute, post-acute and long term phases. Benchmarking is considered as a potential tool to assess quality and outcomes of the care offered. Based on experiences in the quoted Edisse study and CBO-innovation initiatives in health care (so called CBO-doorbraakprojecten, some of them coached by "kwaliteitsinstituut gezondheidszorg[gg]), lead to a benchmark study. Measures included measures about structure characteristics of the region in which a network was active, Questionnaires of the members of the organisation(s) and patients and informal carers satisfaction. The benchmarking model is very closely related to ideas about performance approaches. However, the authors of the report state that further analysis is needed on the indicators used for benchmarking networks of care. Moreover, benchmarking requires particular efforts and commitment of the organisations involved, to participate in the benchmarking activities[151]

A different pilot-project related to the development of networks of care and the benchmarking, focuses on the development of data-information and management models adapted to the networks of care (cva keteninformatiesysteem CVA-KIS). This

gg www.cbo.nl

system develops a dataset to be used to register data about patient characteristics and rehabilitation activities in the networks of care. The system is not only intended to register data, but also to support health care providers in the workflow. As the identification of the data needed is based on a Delphi technique, some indications can be found on what the professionals think what is needed to register. In general terms, a better registration of the patients co-morbidities, secondary diagnoses and a clearer registration of the rehabilitation aims per facility is considered as necessary [154].

As the indication rules for transfer between facilities are not fixed, it is hoped for that the benchmark-reports will lead to a more comparable and uniform approach between regions for patient referal.

The use of outcome scales.

The discussion about the use of outcome scales is of current interest, but not very developed. At this stage one recommends at least the use of the Barthel-index. In order to assess and discuss the therapeutic aims of the patient, some professionals suggest to use the Canadian Occupational Performance Measure (COPM), or the AMDAS Stroke-unit discharge guideline, to assess the rehabilitation potential of the patient[155, 156] Since a lot of efforts are going to the development of DBC's, the debates of the use of scales id focusing on ICD-9, ICF and Barthel (and especially on how to develop an efficient registration of all these scales, and make them useful tools).

- **Stroke is particularly interesting example for its initiatives on developing networks of care.**

8.3.6 Example: Lower extremity amputation

The total group of amputations constitutes only a minor part of the combined out- and inpatient rehabilitation in the Netherlands: 2% of outpatient and 6% of inpatient rehabilitation for adults (2003)[157]. About 3300 major amputations of the lower limb occur in the Netherlands[66, 158] .Pernot et al.[65] have estimated the average rehabilitation period for persons with a lower limb amputation at 35 weeks. There are no rehabilitation centres playing a role as reference centre.

The largest part of people with a LEA (about 40%) are referred to a nursing facility. Another part is directly referred home, and continues multidisciplinary rehabilitation in a policlinic of a hospital or a rehabilitation facility. Only a minority of the group (10-15%) starts a clinical rehabilitation in an inpatient rehabilitation setting [158].

There are no fixed indication rules for the referral to one or another setting. As a general principle, the patients' choice is the primary stimulus for a service. The indication is generally also affected by the physical condition, the motivation and the learning capacities of the patient. It is generally accepted that the functional outcome can be assessed two weeks after the event, by taking into account the age, motivation and learning potential and the one leg equilibrium. Especially the older people (75-80+) prefer to return as soon as possible in their own region or at home. This choice is largely influenced if partners (family or friends) have difficulties to visit a hospital or rehabilitation setting [158].

Admission to an inpatient rehabilitation setting generally is foreseen about 10 days after the surgical intervention. The admission to a nursing facility takes about 10 to 20 days. Wound care is an important issue in the timing of referral.

In a nursing facility, about 30% receives a prosthesis, in a rehabilitation facility this proportion is about 85%. Prosthesis rehabilitation training is offered in nursing facilities, hospitals and rehabilitation settings. But for more elaborated prosthesis rehabilitation, people are generally referred to a rehabilitation center. There is no specific rehabilitation program for people without a prosthesis. Small scale research gives indications of variations in the prescription of prosthetics. Policy makers are urging to develop a clinical guideline with more clear criteria for prescribing a prosthesis, and a draft guideline has recently been developed.[159]

There is no consensus on the use of outcome scales in rehabilitation, and different scales were used in different Dutch regions. The Sickness impact profile (SIP-68) scale and the Groningen Activity Restriction Scale (GARS) [160] timed up and go test (TUG) Barthel score en de FIM are used. The one leg equilibrium scale is often used. There is however no indication if these scales are used systematically in all the centres

- **Prosthesis rehabilitation training is offered in nursing facilities, hospitals and rehabilitation settings. For elaborated prosthesis rehabilitation, people are generally referred to a rehabilitation centre.**
- **There are no fixed indication rules for the referral to one or another setting.**

8.4 FRANCE

8.4.1 Health care organisation in general[hh]

The French health care system is a centralised mixed system combining elements of various organizational models:

- It is a publicly funded system characterized by freedom of choice and unrestricted access for patients and freedom of practice for professionals;
- The organizational model is built on health insurance funds and strong state intervention. it is complex and pluralistic in its management, with co-management by the state and the health insurance funds.
- It combines public and private health insurance, which finance the same services by the same providers for the same populations;
- it combines public and private care, including private for-profit hospitals;

8.4.1.1 Health insurance

The financial management of health care in France is mainly regulated through the statutory health insurance as a branch of the wider social security. It covers the entire population of France. The health insurance system, offers wide-ranging reimbursement in the fields of preventive, curative, rehabilitative, and palliative care.

There are three main schemes within the statutory health insurance system: a general (employees in commerce and industry and their families), an agricultural scheme for farmers and their families and a scheme for self-employed people. In 2004 an insurance fund was established specifically for dependent elderly people. In 1999 universal health insurance coverage (CMU) was established on the basis of residence in France (99.9% coverage for medical expenses).

The health insurance is compulsory and covers all households regardless of health status, income, number of persons, etc. It provides a somewhat uniform field of reimbursement, with the "basket of goods and services" covered by the insurance funds being identical for all the statutory schemes, and a same reimbursement rate for the three main insurance schemes (since 2000).

Health benefit catalogues are drawn up at national level with the whole range of goods and services reimbursed by the statutory scheme. The reimbursement of goods and services depends on their inclusion in defined lists, identified through advice of ad hoc scientific commissions and agencies, such as the former National Agency for Accreditation and Evaluation in Health Care (ANAES)- the current haute autorite de santé (HAS), checking for the effectiveness and/or safety of these procedures and the conditions under which they need to be per formed

More selection is occurring in the insured services delivered by private sector profession in their own practices or in private for-profit hospitals. Services dispensed in public hospitals or private not-for-profit hospitals are mainly the subject of implicit definition since they were paid for by a global budget.

8.4.1.2 Health care policy-making and organisation

The French health care system is a very centralized model, with an important role for the regions. Regions are responsible for the factual organization and execution of health

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[hh] This paragraph is mainly based on the report "health systems in transition: France, WHO, 2004.

care policy, while the central authorities define the policy and operational framework. (see Appendix to chapter 8)

8.4.1.3 Financing

The financing model is subject to important reforms. The Social Security Act of 2003 (Loi de financement de la sécurité sociale, LFSS) changed the inpatient acute care funding rules, but implementation is still in progress. The nomenclature for physicians' procedures, the CCAM, applies from that date to both private and public hospitals. The reform will also change the remuneration schemes of inpatient and outpatient care.

- Services provided in inpatient or outpatient acute care will be financed through a payment-per-case system for all hospitals (700 Groupes Homogènes de Malades (GHM), considering co-morbidities and a nationally fixed tariff (Groupe Homogène de Séjours, GHS).
- Outpatient procedures will be paid on a fee-for-service basis
- Organ retrieval and emergency services by annual lump sum payments.

Physicians are al ways paid separately and directly on a fee-for-service basis, except in public hospitals, where tariffs include specialists' salaries.

- **France has a publicly funded system characterized by freedom of choice and unrestricted access for patients and freedom of practice for professionals.**
- **France has a compulsory insurance system, but a large proportion of the population has private (complementary or supplementary) insurance.**
- **France is a centralized model, but has delegated a lot of operational responsibilities to the regions. The "regional hospital agencies" (ARH) are responsible for hospital planning (for both public and private hospitals), financial allocation to public hospitals and adjustment of tariffs for private for-profit hospitals.**
- **The SROS (Schéma Régional d'Organisation Sanitaire) is the regional planning tool for health care provision. The SROS provides the regional hospital agencies (ARH) with a framework for granting authorizations, approving proposals submitted by institutions and negotiating contracts.**
- **Services provided in inpatient or outpatient acute care will be financed through a payment-per-case system for all hospitals (700 Groupes Homogènes de Malades (GHM), corrected for co-morbidities and a nationally fixed tariff (Groupe Homogène de Séjours, GHS).**

8.4.2 The organisation of the rehabilitation sector

8.4.2.1 The underlying conceptual ideas

Rehabilitation is conceptually organised around three levels of care[161, 162]

- The specialized level of care has to answer very specific needs of a particular group of patients within a region. At this level specialised "reference" centres are identified, in charge of advanced medical and paramedical care. These services fall under the responsibility of a physician, and medical and paramedical team with specific competencies for the pathology
- A second level is created for high needs or specific care needs requiring particular competences. This level is typically foreseen for the non-complex neurological pathologies (such as MS and stroke) and for geriatric care.

- The "low" level is created for general multidisciplinary rehabilitation and medical care, generally attached to hospital services and typically foreseen for short term rehabilitation, often in close collaboration with the SSR.

A specific regulation of 1997 defines five functions of technical and support tasks for continuous care or rehabilitation:

- limit the impairments through rehabilitation,
- somatic and psychological rehabilitation through intensive treatment or teaching compensatory techniques, education of the patient (and his peers),
- follow up in after care and control of pain
- taking initiatives for reintegration in society.

These principles have to be realised through the development of a continuity of care model (filières de soins).

The organization of the rehabilitation sector has a clear regional orientation. Four geographical levels are distinguished, conceptually closely related to the notion of "filiéres de soins". They aim at serving people as close as possible to their home, integrating them into daily life as far as possible:

- The interregional or regional level: on the interregional level services are responsible for highly specialised care for pathologies with low incidence/prevalence (e.g. burn units, visual deficits or auditive deficits), but for which specific technology and infrastructure is needed.
- On the regional level, specialised centres, using particular technologies, having an adapted infrastructure and competences but for which also the idea of accessibility for people of the region is taken into account.
- The "intermediate" level, is defined as the less specialized rehabilitation services, clearly serving the people from a geographically near area. It are services not requiring very specific technologies or infrastructure.
- The local level (niveau de proximité) is the alternative form of hospital services, offering medical and rehabilitation care at home.

The regulations "soins de suite et de readaptation" (SSR) form the framework for middle-long term rehabilitation services (moyen sejours) are as follows. As a general principle, the SSR aim at patients coming from acute or post-acute settings or other SSR, and are primarily aimed at social reintegration for those people in need of a global medical-rehabilitation for deficiencies or impairments, in need of a medical follow up, or in need of functional rehabilitation. They are conceptualized as the "in-between-services" between acute hospital environments and the home care setting (or long term care facilities). There are "general" SSR and SSR specializing in geriatry, cardiology and nutrition[163] . The agenda for the SSR is centrally set by means of circular letters (circulaires) (lettre circulaire DH/EO4/97 n°841 du 31 décembre 1997 relative aux orientations en matière d'organisation des soins de suite ou de réadaptation ; la lettre circulaire DHOS/03/DGAS/AVIE n°2003-257 du 28 mai 2003 relative aux missions de l'hôpital local (notamment dans son paragraphe « Développer l'hospitalisation en soins de suite et de réadaptation »). In 2005 HAS/ANAES has published a report on the state of the art of SSR, in which the roles and missions of different services are clearly described.

8.4.2.2 *Rehabilitation facilities*

Rehabilitation can take form in intramural settings (hospitals, specialized rehabilitation and nursing facilities), in ambulatory form (day hospitals) or in home care, depending on the clinical status of the patient. The most important post-acute facilities are university based rehabilitation units, general hospital rehabilitation units and rehabilitation centres[ii]

- The mission of MPR (medicine physique et réadaptation) in university hospital centres is focused on teaching, research and expertise highly specialised rehabilitation and has to participate in networks of care.
- MPR services within hospitals are polyvalent rehabilitation services not necessarily involved in highly specialised rehabilitation
- Rehabilitation centres are specialised and polyvalent facilities often reference centres for specific pathology groups, and also expected to participate in networks of care. Teaching and research can be part of their mission

Due to historical reasons, France has an uneven geographical distribution of rehabilitation centers. For this reason units for rehabilitation in acute hospitals (both in Centres Hospitaliers, and almost always in Centres Hospitalier Universitaires) play an important role in rehabilitation in the different regions. They focus on the medical and paramedical issues of rehabilitation.

The services for medical rehabilitation (medicine physique et réadaptation MPR) are specialized rehabilitation units generally linked to hospitals, and often with a day care function.

The reforms prepared in the mid 1990 aim at guaranteeing a regional, needs based approach, and developing a more smooth patient flow. Through the "filières de soins", these hospital services are urged to collaborate with other inpatient and home care facilities, for other dimensions of rehabilitation care. Through these models, one hoped to reduce lengths of stay in inpatient settings, manage the issue of waiting lists, and coordinate the services offered to the needs of the patients.

An important rather new "French" development is the development of the "hôpital a domicile", delivering medical and rehabilitation services, for people returned home. Not all regions have this service available, but it is a type of service that is developed more and more.

For those people unable to (immediately) return home after the post-acute phase, different types of long term-care facilities are available: (Unités de soins de longue durée, maison d'accueil spécialisée (MAS) foyer d'accueil médicalisé (FAM) and « établissement hébergeant des personnes âgées dependants », (EHPAD)).

8.4.2.3 *Indication setting in rehabilitation*

For some types of treatment, such as physiotherapy and spa treatment, the prescription from a physician does not provide the status for reimbursement. Coverage by statutory health insurance is subject to the prior authorization (entente préalable) of the physicians advising the health insurance funds, after examination of the patient's case history and a possible interviewing of the patient. However, France is not using a systematic model of indication setting: the indication setting is left to the clinical authority of individual physicians.

8.4.2.4 *Financing of the institutions*

Rehabilitation facilities are falling under the hospital financing regulations. Public and most private non profit hospitals receive a prospective global budget defined by AHR (taking into account historical budgets, relative costs per DRG and priorities in the

[ii] http://www.anmsr.asso.fr/anmsr00/crf/intro.html

SROS). Individual hospitals and the AHR work according to a model of contracting, defining the tasks and commitments of the hospital (quality of care, efficiency, activities,..) Private hospitals have a topic oriented billing system, independent of the fees to paid for the physicians. As a result, prices do vary enormously per region and between hospitals.

8.4.3 Quality

The "charte de qualité en medicine physique et de réadaptation" is used as a formal quality agreement and as a complement to different regulations defining the constituent norms of rehabilitation services. But this agreement is mainly limited tot a formal statement.

In general one could say that France is mainly reflecting on the conceptual and "principles" level about quality. Several documents are being prepared, but no real quality models or indicators as a collective instrument are implemented. The principles proposed are not to be considered as quality tools in the technical meaning of the word.

The quality policies and approaches in rehabilitation are getting inspiration from the CARF accreditation methodology. A working group has been developing criteria for rehabilitation care for different "locomotor" pathologies ("Critères de prise en charge en médecine physique et de readaptation").[162] The text of the working group is considered as an important reference document in France for the rehabilitation approach for different pathologies.

The infrastructural and equipment characteristics of the facilities (as a condition for quality rehabilitation) are being summarised too[jj]

Different "circulaires" have been developed identifying the expected level of quality and the norms for treatments (e. g. Circulaire n° 2004-280 du 18 juin 2004 relative à la filière de prise en charge sanitaire, médico-sociale et sociale des traumatisés crânio-cérébraux et des traumatisés médullaires ; Circulaire n° 2003-517 du 3 novembre 2003 : relative à la prise en charge des accidents vasculaires cérébraux) ;

Rules of accreditation apply to the institutions providing Rehabilitation Care. The ANAES- "manuel d'accréditation des établissements de santé", (with a chapter on SSR) sets some organizing principles, and focuses on patients rights. It also introduces the idea of using functionality scales, but this issue has to be developed further

For the institutions providing SSR as a segment of their activity, a specific section in the accreditation reports offers an overall appreciation of these services. The accreditation is however not using specific indicators.

In general, accreditation is used to be more structure oriented, but slowly quality standards started to be integrated. Most of the emphasis has been on hospital acquired (nosocomial) infections, there are some specific norms (process oriented) and objectives. However, real quality assessment tools are not used yet.

In order to develop follow-up systems, some regions very recently started to develop (epidemiologic) registration systems, including a follow up of patients.

Rehabilitation is conceptually organised around three levels of care: a specialized level for very specific needs of a particular group of patients within a region. A second level is created for high needs or specific care needs requiring particular competencies. The "low" level is created for general multidisciplinary rehabilitation and medical care, generally attached to hospital services and typically foreseen for short term rehabilitation.

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jj http://www.syfmer.org/referentiel/qualite_mpr/syfcharte04.html

- **The organisation of the French rehabilitation sector has a clear regional orientation. Four geographical levels are distinguished: interregional, regional, intermediate and local level.**
- **The regulations "soins de suite et de readaptation" (SSR) form the framework for middle-long term rehabilitation services.**
- **Rehabilitation can take form in intramural settings (hospitals, specialized rehabilitation and nursing facilities), ambulatory (day hospitals) or home care, depending on the clinical status of the patient.**
- **France is not using a systematic model of indication setting: the indication setting is left to the clinical authority of individual physicians.**
- **Rehabilitation facilities are falling under the hospital financing regulations.**
- **France is mainly reflecting on the conceptual and "principles" level about quality. Several documents are being prepared, but no real quality models or indicators as a collective instrument are implemented.**

8.4.4 Example: Stroke

The approach of stroke rehabilitation fits into the model of the SSR ("soins de suite et de réadaptation"). The organisation model should hold the notion of integrating the activities of different services and developing "chains of care".

A circular letter ("circulaire") was endorsed in november 2003 for the treatment and rehabilitation for people with stroke (Circulaire n°2003-517 du 3 novembre 2003 relative à la prise en charge des accidents vasculaires cérébraux). The circular letter describes the formal conditions, and creates opportunities within the SROS, to develop facilities for taking care of stroke patients close to home (hôpitaux de proximité).

An Anaes-study has focused on the different aspects of treatment of stroke patients. The study focuses on clinical guidelines, including post-acute rehabilitation[164] This report is not paying a lot of attention to organizational matters in stroke rehabilitation, except that some infrastructural issues are mentioned. A major recurrent recommendation is that networks of care services have to be developed in order to provide integrated care.

In August 2005 the HAS-ANAES has launched an evaluation tool-kit for assessing the scope of care offered for stroke patients. The tool-kit aims at supporting the services in doing auto-evaluations and improving the quality of care. It is supposed to steer the future quality assessments of stroke services.

8.4.5 Example: Multiple Sclerosis

Rather recently, an assessment has been made analyzing the state of the art of MS-related topics in France [165]

As is the case in many other countries, MS and the particular needs of MS-patients, make the organisation of rehabilitation for this group of patients a particular issue In general terms the treatment and follow up of MS patients in France is very heterogeneous.

Only in few regions, specific initiatives have been set up to coordinate the treatment and care of MS-patients. Since 2001, some regional networks are formally recognized as MS-care networks ("reseau de soins sclerose en plaques (SEP)"), and others are in preparation. The major network-aim is to offer different kinds of (para)medical and social care in a coordinated way, as close as possible to the patient.

Some regions are (at this stage) not covered at all by a formal network of care. Moreover, there is a great disparity between the existing networks in the number of participating patients. The operational conditions of these networks are very dissimilar,

for professional participation as well as the patient inclusion, as there are no common indication standards.

Inpatient care and support is generally offered in specialized hospital units for short stays. Long term specialized inpatient facilities exist, but are very few in number, leading to particular problems for MS patients with very severe complications. There are currently 5 centres for long term stay for highly dependent ms patients with specific medical and paramedical needs (offering about 230 beds). Experts confirm that the need for this kind of facilities is a lot bigger, but no precise epidemiological estimates are available (ms patient organizations claim that 2000 of these beds should be available to answer the needs).

Other centres have developed units for MS-patients within their general neurological functions. The capacity of the centres varies enormously, some offering 1 to 2 beds, while others have about 60 beds available for MS patients. The average period of stay is between 2 and 6 weeks.

The coordination of medical care is generally in the hands of a private or hospital based neurologist (neurologue de proximité), having to play a role in the network of carers (réseau). The hospital settings vary, as not all hospitals have a neurology department. It can however happen that some of these hospitals hire the services of a neurologist, doing the follow-up of the patients. Many neurologists in France have a private practice within the hospitals (des attachés).

Some university hospitals (Dijon, Rennes) organize themselves inspired by a Canadian specialized model of clinical practice for MS. During a whole day, and in collaborative practice with different physicians, the whole spectrum of problems of different MS patients is assessed. These centres also try to work in networks of care.

More common forms of multidisciplinary follow-up (medico-social) of ms-patients are found in regional hospitals (generally funded through proper means of the hospital and private gifts).

For assessing the status of MS patients, the Expanded Disability Status Scale (EDSS, also named Kurtzke scale) is used, measuring 8 functional domains and enabling the neurologist to give a Functional system score. The scoring scale is mainly used as tool to assess the severity of the condition of the patient, and mainly as a clinical tool to assess the progress of ms. The scores are also used as an informal indication setting tool for offering particular health care services.

8.4.6 Example : Spinal Cord Injury

France has no really integrated approach of the rehabilitation of people with spinal cord injuries. However recently particular concerns are developed on the organization of care.

A circular letter (Circulaire DHOS/SDO/01/DGS/SD5D/DGAS/PHAN/3 B n° 2004-280 du 18 juin 2004) focuses on the organisation of care for patients with SCI and TBI, with a particular attention on necessary care and the demand for continuity of care. The SROS (schéma régional d'organisation sanitaire) should provide in foreseeing the necessary conditions.

The "Académie Nationale De Médecine" has formulated recommendations on the rehabilitation of SCI patients[166]. The main line of reasoning is that specific and specialised rehabilitation centres are needed in the French rehabilitation landscape. The "Académie" recommends to develop a territorial map and a list of reference centres for the French territory. The Académie recommends to create 12 reference rehabilitation centres, with a maximum of 3 or 4 for the Ile the France and neighbouring departments. The recommendation is however not clear on the criteria used to make this recommendation.

8.5 GERMANY

8.5.1 Health care organisation in general

A fundamental aspect of the German health care system is the sharing of decision-making powers between the federal government, the individual states (Länder), and designated self-governmental institutions. Responsibilities are delegated to membership based, selfregulated institutions of payers and providers. These institutions adopt the status of quasi-public corporations and guarantee the financing and delivery of benefits outlined in the legal framework of the statutory health insurance. They are involved in financing and delivering health care.

As is the case in many other countries, the role of private parties is penetrating the organisational principles of the health care model.

8.5.1.1 Health insurance

In the Statutory Health Insurance (SHI), (covering 88% of the population), sickness funds, their associations and associations of SHI-affiliated physicians and dentists negotiate on the insured care. The most important body in the benefit negotiations between sickness funds and physicians concerning the scope of benefits is the Federal Joint Committee. Based on the legislative framework the Committee issues directives relating to all sectors of care.

Citizens have a free choice of sickness funds. Employees with a gross monthly income not exceeding a certain amount (€3.862 in 2004) are mandatory to have a membership in a sickness fund. Higher income levels can opt out. Private insurance companies provide health insurance policies that are substitutive or supplementary to the SHI.

The autonomous sickness funds are organized on a regional and/or federal basis. They are obliged to raise contributions from their members and to determine the contribution rate necessary to cover expenditures. Their responsibilities include contracting, negotiating prices, quantity and quality assurance measures. Services covered by such contracts are usually accessible to all fund members without any prior approval by the fund, except for preventive spa treatments, rehabilitative services and short-term home nursing care that require an indication setting.

A risk structure compensation scheme is in place which prevents the sickness funds to refuse people at a higher risk for health care services. Members and their dependents are entitled for the benefits: prevention of disease, screening for disease, emergency and rescue care and treatment of disease. In the latter category ambulatory care, care by allied health professionals and certain areas or rehabilitative care are included. Ambulatory care is only described in generic terms whereas care by allied health professionals is more elaborated. These services that are reimbursed by the SHI are linked to indications and therapeutic targets and need to be prescribed by a physician. [167]

8.5.1.2 Health care policy making and organisation

The legislative authority regulates the procedures with which the contractual partners determine the scope of SHI services. The "Federal Joint Committee" issues directives about adequate and cost-effective medical interventions for the insured persons. In the Länder as well as in the federal government, a department of health is installed, although not always as a distinct ministry. The sickness funds have a central position in the health insurance system.

The sickness funds are obliged to collect contributions from their members. In return these funds negotiate prices, quantities and quality with providers on behalf of their members.

Health care delivery in Germany is typified by a clear delineation between public health services, ambulatory care and hospital care. The 'strict' legal and financial delineation

between the different sectors hampered the integration of hospital and ambulatory. The Reform Act of SHI 2000, enhanced by reforms in 2002 and 2004, enabled (by means of incentives) the implementation of models of integrated care.

See Appendix to chapter 8.

8.5.1.3 Financing

In 2000 the Australian system of diagnosis-related groups (DRGs) was adopted as the basis for developing a German DRG hospital financing system. the development of a DRG catalogue is seen as a starting point towards a more explicitly benefit catalogues where all approved interventions are listed and grouped around the relevant diagnoses.

The Institute for the Payment System in Hospitals (InEK) is intended to support the introduction and the further development of the DRG sys tem. The Institute defines the DRG case groups, maintains the DRG system, and its severity classification system, develops of a coding directive The Institute is also responsible for the calculation of DRG cost weights and individual adjustments with in the DRG system.

A catalogue lists all procedures (services) performed in hospitals in accordance with respective clinical diagnoses. The DRG system also constitutes the catalogue of services and benefits covered by the SHI scheme for inpatient care. The inclusion of new health care ser vices in the DRG system is made available at the beginning of each year. (based on ICD 10)

- **The German health care system shares decision-making powers between the federal government, the individual states (Länder) and designated self-governmental institutions. Responsibilities are delegated to membership based, selfregulated institutions of payers and providers.**
- **All employees below a given income level must subscribe to an independent not-for profit sickness fund. Individuals above that income level have the right to opt out and arrange private coverage (a minority of the population). The role of the sickness funds is publicly regulated.**
- **The sickness funds have a central role. Sickness funds contract for health care services and negotiate prices, quantity and quality assurance measures.**
- **Hospital care is outlined by federal legal framework. Planning and regulation are done at Länder level, resulting in variation in offer among the different Länder.**
- **The Australian system of diagnosis-related groups (DRGs) was adopted as the basis for developing a German DRG hospital financing system.**

8.5.2 The organisation of the Rehabilitation sector

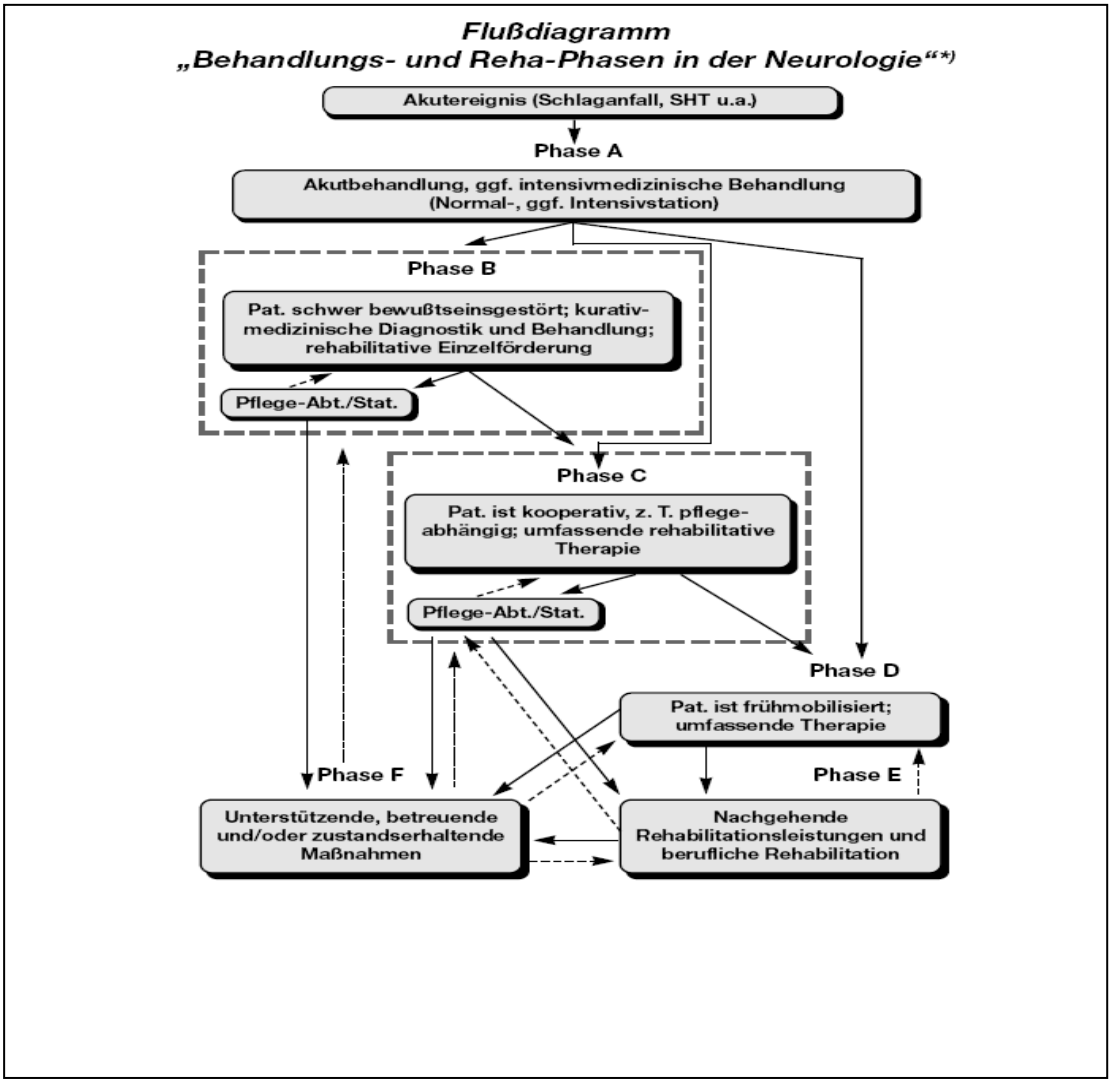
8.5.2.1 The underlying conceptual ideas

Rehabilitation is defined as a multidisciplinary team approach adapting to the patient's needs. During the recovery period, these needs vary resulting in different goals in different phases. A distinction is made between medical, vocational and social rehabilitation.

Because of the historical formal segmentation between hospital care, rehabilitation care and ambulatory care, delays or inconsistencies occur(ed) in the referral for further rehabilitation. As mentioned earlier since 2000-2004 models of 'Integrierte Versorgung (integrated care model) 'were set up for heart failure and hip joint replacement. The SHI, care providers and hospitals develop agreements to organise the full range of services, from acute care to the completion of rehabilitation period[168].

Patients older than 70 years are less eligible to these models and are referred to geriatric rehabilitation. Geriatric rehabilitation is a special category of rehabilitation in Germany offering less intense rehabilitation compared to the other models.[169]

Figure 8.1: The 'Phasenmodell' in neurorehabilitation (BAR, Die Bundesarbeitsgemeinschaft für Rehabilitation, 1999)



Specifically, for neurorehabilitation a conceptual ‘Phasenmodell’ was developed to streamline the thinking about rehabilitation services. The model distinguishes 6 phases (see Figure 8.1). The patient may not go through all phases neither pass them in chronological order. In Phase A, the acute treatment is the major priority. As soon as the patient is medically stable, the first rehabilitation interventions can take place. Phase B is a phase in which the patient still may need intensive care support and has not reached a sustained phase of full consciousness. If the patient evolves to a condition enabling active participation in the rehabilitation process and where significant improvement for his functional independency can be expected, the patient will move to Phase C: a period of intensive rehabilitation where supervision of nurses and medical staff is still needed. If no improvement is expected, it will be decided to transfer him to a long-term nursing care setting (Phase F).

If no further nursing support is needed but improvement is still expected, the patient will then continue to Phase D.

Phase A trough phase D is organised in different types of intramural settings. Acute hospitals have the necessary technical equipment and expertise to support the patient in

his life-threatening condition. For Phase B, services need to have an intensive care unit or can call upon immediate access to a hospital in the direct neighbourhood. In practice these inpatient settings can be: acute hospitals, specialised clinics in neurology or general rehabilitation clinics.

Patients in Phase C are still hospitalised and treated in a rehabilitation centre or specialised clinic, as they require supervision of nursing care and medical treatment or follow up. Phase D patients can be helped in an inpatient or outpatient service. Patients in Phase E are mostly cared for in an outpatient setting. Phase F patients expect no recovery and have high functional dependency and are supported in long-term care settings with nursing support.

The "bundesarbeitsgemeinschaft fur rehabiliation" has developed recommendations for the organisation of neurological and musculoskeletal rehabilitation [kk] But these recommendations focus mainly on the clinical approach of the patients (in certain phases of their disease within organizational formulas).

Other reflections started on the development of "mobile rehabilitation" trying to bring rehabilitation services to the home. The focus of these reflections is mainly geriatric rehabilitation. [ll]

8.5.2.2 *Rehabilitation facilities*

Medical post-acute rehabilitation is mainly offered in specialised rehabilitation clinics, although out-patient and part-time in-patient care has considerably grown. Within the past decades changes were implemented in the organization of rehabilitation, mainly trying to ensure smooth patient flows, and offering rehabilitation services at home (integrated care). Moreover, the insurance negotiations have had a major impact on the provision models of services as insured parties receive different rehabilitation benefits depending on the insurance type.

The rules for providing and financing social services are regulated at federal level. The social code book (Sozialgesetzbuch, SGB) forms the core of the legislation. Regulations relevant for rehabilitation are mostly found in volume 5 and 9 of the SGB.

- Several research networks are established to clarify (among other research themes) the role of different services in this rehabilitation process but no definite conclusions can be drawn from these studies[mm].

8.5.2.3 *Indication setting*

In daily practice, approvals for admission to rehabilitation facilities are needed by the insurance companies.

Early rehabilitation in hospital obtained a new legal basis with the Sozialgesetzbuch IX (SGB IX) of 2001,. In § 39 section 1 SGB V, early rehabilitation was for the first time explicitly described as part of hospital treatment. However, the German system is still seeking ways to optimise the use of rehabilitation facilities and looks for standardised models of indication setting. Currently a lack of generally accepted indication criteria for early rehabilitation services is experienced and the aims, objectives and methods need to be specified.

Based on Delphi methodology a group of interested experts from different fields and backgrounds to achieve an interdisciplinary consensus in terms of conceptual definitions and terminology for all early rehabilitation care services in the acute hospital was developed. Examples of typical cases from the various fields of early rehabilitation care were identified and described. Furthermore, the report points out a number of other

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kk http://www.bar-frankfurt.de/Empfehlungen.BAR?ActiveID=1083

ll http://www.dvfr.de/pages/static/1834.aspx

mm http://www.gesundheitsforschung-bmbf.de/_media/forschung_in_der_rehabilitation-englisch(1).pdf

problems in the area of early rehabilitation care, which have yet to be solved.[170] In a position paper, indication guidelines were presented by a group of German experts [171].

In the conceptual model for neurorehabilitation the Barthel Index is used as an indication setting tool to discriminate between phase B, C and D). ([0-30]=B; [35-65]=C; [70-100]=D

8.5.3 Quality in Rehabilitation

Germany has a longer experience with imposed "external" quality assurance initiatives in medical rehabilitation. Quality assurance programmes have been routinely implemented for most inpatient rehabilitative indications, and are characterized by their comprehensive approach [172]. This is most of the time imposed by private insurance companies or sickness funds. In 1994 the German statutory pension insurance developed a model of quality assurance in rehabilitation, that was imposed in 1998. It is based on indicator tools relating to structural, procedural as well as outcome quality [173, 174] The statutory health insurance has imposed quality assurance models, trying to guarantee effective and efficient rehabilitation. By developing clinical practice guidelines specific to rehabilitation, the pension insurance is the only sector of the German health system in which quality evaluation is carried out on the basis of clinical practice guidelines. The quality assurance programs are intended to impact on the allocation of patients as well as the financing of the rehabilitation services. So far, this is the first and only health care sector that has included the use of evidence-based practice guidelines into quality assurance activities.[174] However, corresponding to the relative paucity in rehabilitation research there is no sufficient evidence for a lot of the therapeutic interventions. Accordingly, guidelines in rehabilitation will -initially- consist of a mixture of evidence- and consensus-based recommendations. There are many initiatives by the providers of rehabilitation as well as the scientific medical societies to develop and implement rehabilitative clinical practice guidelines, e. g. the guidelines programme of the BfA (Federal Insurance Institute for Salaried Employees), which is aimed at developing rehabilitation process guidelines for selected indications (mainly vocational rehabilitation), the guidelines activities of the VDR (Federation of German Pension Insurance Institutes), and the input of the "Guidelines" commission of the DGRW (German Society of Rehabilitation Science)[175]. Since 1998, the German Federal Pension Insurance for Salaried Employees (BfA) has funded several research projects aimed at developing clinical practice guidelines for medical rehabilitation. The elaboration of standards is aimed at avoiding over-provision, under-provision or misdirected provision of care and, simultaneously, at ensuring that quality assured treatment is offered to the rehabilitees. Also, it is intended to increasingly implement evidence-based medicine in a sector of the health system in which research has so far been underrepresented. The guidelines are since 2005 being integrated into the BfA's quality assurance system. Using a standardized protocol, therapeutic processes for individual disorders were evaluated as to whether they were evidence-based. After successful implementation of the program, a substantial reduction of practice variation among rehabilitation institutions is hoped for. For that reason, comparative quality analyses are the focus of the quality assurance programmes. In the context of the Quality Assurance Programme for Rehabilitation provided by the German statutory health insurance, the structural quality of 18 neurological rehabilitation units was assessed. It is argued that Assessing the structural quality of rehabilitation units on the basis of defined standards allows for a benchmark between units as well as for improvements within the individual units. [176]

These comparative analyses have shown that centres with little experience with severely affected rehabilitation patients achieve on average lesser effects on somatic functional and psychosocial levels[177, 178]. The external pressure to develop quality assurance, and the increased competition for patients between rehabilitation centres have lead to the development and research on more effective and efficient rehabilitation models.

For outpatient rehabilitation facilities, quality assurance programmes are under development.

Currently, rehabilitation centres face the problem of treating patients from different health insurance companies. Sometimes different proofs of quality have to be demonstrated, leading to a large overhead and administrative cost [179] Efforts are now on their way to guarantee a convergence of the different quality assurance programs[180] Reflections have started to take form on the quality of services and quality assurance programs in integrated care.

Recent efforts are made to refine the standards used in the quality assurance programs. Some projects are focusing on the study of the structural standards for inpatient rehab units treating patients for musculoskeletal, cardiac, neurological gastroenterological, oncological, pneumological and dermatological diseases. The aim of these projects is to distinguish between basic criteria that every inpatient rehab setting has to fulfill, and the more specific structural characteristics of each of the rehabilitation specialisms. Relevant structural criteria were defined in expert meetings by means of a modified Delphi-technique with five inquiries. 199 "basal criteria" and "assignment criteria" were defined. The criteria are grouped in two domains: general structural characteristics (general characteristics and equipment of rooms; medical/technical equipment; therapy, education, care; staff) and process-related structures (conceptual frames; internal quality management; internal communication and personnel development). The structural standards are applicable to units for musculoskeletal, cardiac, neurological, oncological, gastroenterological, dermatological and pneumological rehabilitation[181] These projects are in this stage mainly research and/or pilot projects.

Integrated care models are being developed for rehabilitation, taken into account phases of rehabilitation. A conceptual model has been developed for neurological rehabilitation

- **In Germany, medical post-acute rehabilitation is mainly offered in specialised rehabilitation clinics, although outpatient and part time inpatient care has grown considerably.**
- **Approvals for admission to rehabilitation facilities by the insurance companies are needed.**
- **Quality assurance programmes have been routinely implemented in rehabilitation, most of the time imposed by private insurance companies or sickness funds. The statutory health insurance has imposed quality assurance models. Quality assurance programs are intended to impact on the allocation of patients as well as the financing of the rehabilitation services.**
- **Patients older than 70 years are less eligible to these models and are referred to geriatric rehabilitation. Geriatric rehabilitation is a special category of rehabilitation in Germany offering less intense rehabilitation compared to the other models.**

8.5.4 Example: stroke and neurological rehabilitation

The organisation of neurological rehabilitation has been described in the paragraph "underlying conceptual ideas". Additionally it is worth mentioning that early rehabilitation in neurology (phase B) is mainly carried out in specialised neurological hospitals and in rehabilitation hospitals and, very rarely, in general hospitals.

8.5.5 Example: LEA and THR

The conceptual reflection in terms of a "phasenmodell" is not used for Rehabilitation after orthopaedic surgery, implying that individual needs are far less considered. In the acute phase, patients stay in the acute hospital. The duration of the inpatient stay is mainly defined by the prospective payment system based on the RDRG's.

Patients are discharged home or to a rehabilitation hospital for further training. In the latter situation, the period is defined under 'Anschlussheilbehandlung (AHB)' and refers to the period directly after acute hospitalisation.

An approval by the health insurance companies prior to admission is necessary. The initial length of stay approved is 3 weeks. A prolongation of inpatient stay can be requested by the physician and needs to be approved by the health insurance company before it is granted. Patients discharged home may use rehabilitation services at home or in a system of outpatient services.

In general, the rate of total hip replacements (THR) in Germany can be considered as one of the highest in Europe, next to France and Switzerland. In 2003, estimations were made at 145-183 THPs per 100.000 habitants in Germany compared to 66-90/100.000 and 101-132/100.000 for Italy and the United Kingdom respectively.[182] The average length of stay in the acute hospital was 14,1 days in 2005.[183] International comparison on the average LOS after THR revealed that this is longer than hospitals in the UK and US. A longer pre-operative hospitalization and the admission to the intensive care unit as a general practice rule were suggested as explanations for these higher LOS in Germany.[184] After a stay in the acute hospital patients are mainly referred to Anschlussheilbehandlung (AHB), which is a service of inpatient rehabilitation following an acute hospital stay. On average, the AHB-LOS is 15,7 days.[183] As mentioned earlier, the German health care system is characterized by the sectoring system between acute hospitals and rehabilitation services. Recent health-policy measures were implemented to facilitate enhanced collaboration between both sectors by introducing integrated health care plans [Integrierte Versorgung]. The implementation occurs over several phases and THR is one of the first indications using this type of health care plan. However, data on the effects of the integrated health care plan for THR on LOS were not found.

The incidence of lower extremity amputations in Germany is estimated at 230-660/100.000 habitants for diabetes patients and 2-9/100.000 for non-diabetes persons.[185, 186] No significant changes were observed in the incidence for the period between 1990-1998. More recent data were not found. The average total length of stay in the acute hospital and rehabilitation centre was 9,8 months.[187] In the group of patients with complications, the average LOS was 19,9 months. No distinction was being made between the LOS in the acute hospital and the LOS in the rehabilitation unit. Additionally, it was not clear if only the inpatient rehabilitation was considered or whether it concerned the total rehabilitation period, inpatient as well as outpatient. As only one source was found on the care trajectories of patients with amputations of lower extremity, generalization of the findings is jeopardised.

8.6 SWEDEN[nn]

8.6.1 Health care organisation in general

The Swedish health care sector has undergone several important reforms during the past decades. Generally, national reforms that have had an impact on the health care system have focused on three broad areas: the responsibilities of provision of health care services, priorities and patient's rights in health care and cost containment.

8.6.1.1 Health insurance

The social insurance system is managed by the Swedish Social Insurance Agency. No basic or essential health care or drug package is defined within Swedish health care. Insurance is mandatory. It covers individuals' expenditures for health care and prescribed drugs.

There are direct, small fees for medical attention payable by patients; these fees are in the form of flat-rate payments. County councils have been able to determine their own user charges for hospital and primary care within the national framework since 1991. This practice has resulted in increased and differentiated patients' fees. Ceiling amounts are defined on the total amount that any citizen must pay in any 12-month period. The ceiling for individual co-payments for prescribed drugs is separated from the other health care services.

In 2002, a new fee system was introduced for care of the elderly and the disabled. The purpose is to ensure that all individuals have a certain amount of money to cover living expenses (a reserve sum) once all fees are paid. For elderly and the handicapped, and depending on the level of service and care, together with the number of hours of assistance accorded per month, each municipality sets its own fee schedule in accordance with nationally determined reserve sums and maximum fees.

The market for voluntary health insurance is growing. One of the reasons is the long waiting lists for elective treatment under the county councils. The main benefit of having supplementary insurance is that it allows quick access to a specialist in ambulatory care when necessary. Another benefit might be the possibility of jumping waiting lists for elective treatment.

8.6.1.2 Health care policy making and organisation

The Swedish health care system is organized on three levels: national, regional and local. Health and medical care is separted into three levels:

- regional health care
- county health care
- primary health care (health centres)

Hospitals are mostly independent public facilities. The degree of privatization in hospitals varies among counties. There are nine regional hospitals, some 70 county and provincial hospitals and just over 1000 health centres.

More than half of Sweden's county councils and regions are currently planning to change the structure of their health care organisation. The main elements of the changes involve a combination of extended primary care and specialised hospital care, which is to be concentrated and centralised. Technological developments, competence requirements and cost efficiency are steering the development, so that hospitals and clinics focus on certain specialties or operations.

For highly specialized care, Sweden is divided into six large medical care regions, within which the county councils cooperate to provide the population with highly specialized

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[nn] HIT-report and http://www.sweden.se/templates/cs/BasicFactsheet____6856.aspx

care. The highly specialised centres are university hospitals. The regional hospitals treat all the rare and complicated diseases and injuries. The counties that do not have a regional hospital have agreements with the counties that have the highly specialized care.

The high degree of decentralisation is seen as an important feature of the health care system, but is also questioned because of some inefficiencies. Especially the differentiation in health care approaches between the counties is considered as a problem. A committee is currently reviewing the structure of government and the division of responsibilities and is due to report in 2007. There is a strong case for reducing the number of county councils to perhaps half a dozen or fewer. Some commentators would go further, eliminating that layer of government entirely and shifting responsibility for the hospital sector to the central government (similar to Norway).

8.6.1.3 Financing

The Funding of the Swedish health care system comes from County and local (municipal) taxes, and parish taxes (about 2/3), Central government grants to counties about (1/10) Patient fees (2%) and Mandatory payroll tax from employers and employees (about a quarter)

Most county councils introduced in the 1990's some form of purchaser-provider model, whereby the traditional system of fixed annual allocations to hospitals was to some extent abandoned. The main features of shift were: separation of production and financing; resource allocation to health districts in relation to the needs of the population; and introduction of public competition between health districts (purchasers) and hospitals (providers). Most county councils have decentralized a great deal of the financial responsibility to health care districts through global budgets. Special purchasing units, normally headed by an elected committee of local politicians, have been formed with the task of formulating the requirements which should be made of the hospitals by the county councils and of evaluating quality and prices. Resource allocation principles vary among the county councils. A small group of about five county councils continues to develop per-case payment with expenditure ceilings for some services (primarily hospitals) and capitation models for primary care.

As a purchaser the County Council must make agreements to purchase the appropriate levels and volumes of care from competing providers. As providers, the hospitals, care centers, doctor and practitioners compete for business and have operational responsibility for providing care to the agreed upon levels and volumes, with payment either on a DRG (Diagnosis Related Group) basis or on some kind of per capita payment, often supplemented by some performance-related provisions. The extent of DRGs and other classification systems varies among regions and county councils. Per case reimbursements for outliers, such as complicated cases that grossly exceed the average cost per case, may be complemented by per diem payments Payment is made according to results or performance.

Contracts are often based on fixed prospective per case payments, complemented with price or volume ceilings and quality components. DRGs are the most common case system with respect to short-term somatic care. Primary health care providers are usually paid through global budgets. [188]

The DRG-based financing models replaced the fixed-budgets models after huge critique on increasing waiting list and debates on the accountability of the use of the budgets. At one point attempts were made to give all the hospitals equal reimbursement per treatment but this goal – stressing competition on equal terms –resulted in big deficits for a number of hospitals. In response, purchasers in Swedish county councils decided to accept paying some hospitals a little more and some a little less than the national standard. After an early and intensive "market negotiation period" the market policy turned increasingly to longer-term and more cooperative contracts to define relations between hospitals and the county councils, because of the changing health care landscape. At first the reforms enjoyed uncritical support by a broad spectrum of

stakeholders. Gradually participants in the reform process recognized inherent tensions among the goals of the reform, conflicts between reform programs and fundamental social and political values, unrealistic assumptions about the effects of competition, technical and organizational obstacles to implementation, and threats to interest groups[189].

- **Sweden has a public health care model, going through important reforms in the last two decades.**
- **Insurance guarantees universal coverage: services included are not specified.**
- **Free choice of provider is guaranteed, but some referral is required in special care if patients choose a provider outside the county council.**
- **The Swedish health care system is organized at three levels: national, regional and local.**
- **The county councils play a major role in organizing and financing health care. The county councils have the overall responsibility for all health care services delivered, and have authority over hospital structure. County councils and regions are currently planning to change the structure of their health care organization involving a combination of extended primary care and centralization of specialized hospital care.**
- **For highly specialized care, Sweden is divided into six large medical care regions, within which the county councils cooperate.**
- **County councils determine their own user charges for hospital and primary care. Ceiling amounts are defined on the total amount paid in any 12-month period.**
- **There are global budgets for the counties. The DRG-based financing models replaced fixed-budgets models after huge critique on increasing waiting list and debates on the accountability of the use of the budgets.**
- **Most county councils introduced some form of purchaser-provider model. Special purchasing units on district level have been formed with the task to formulate the requirements which should be made of the hospitals by the county councils and to evaluate quality and prices.**
- **Resource allocation principles vary among the county councils.**

8.6.2 The organisation of the Rehabilitation sector

8.6.2.1 The underlying conceptual ideas

In Sweden rehabilitation is a concept including all medical, psychological, social and work-related measures to help sick and injured to regain conditions for an improved life. Different institutions are responsible for different areas, but it are mainly the local social and health services that are getting the prime responsibility to organize rehabilitation.

The county councils are responsible for patients until they are fully medically treated, more specifically until they no longer require hospital care. After this phase, the physician (together with staff from social care services, other outpatient services and the patient) develops a care-plan designed to achieve further rehabilitation. Once the patient is fully medically treated and a care-plan has been developed, responsibility for the patient is transferred to the municipality.

The responsibility for home nursing and rehabilitation lies between the county councils and the municipalities, which causes tensions.

The municipalities are responsible when people need rehabilitation without hospitalization: generally maintenance training (conscious training to prevent loss of function and to maintain or improve the functions of the individual)

The counties, however, are responsible for discharged patients to have a carefully arranged plan of rehabilitation. All patients who need it, have a continuing rehabilitation plan, no matter who has the responsibility. But, it is difficult to make a clear delimitation between rehabilitation in the health system (counties) and maintenance training and prevention of loss of function in the social system (municipalities). A gradual shift from the specialised rehabilitation at hospitals to the rehabilitation that is normally carried out in the municipalities appears to be taking place. Between the two sectors a grey area in which patients can get jammed insofar as none of the rehabilitative bodies accept responsibility for the rehabilitation of a given patient. The delimitation between the two sectors (in connection with the obligation to continue or to start training) are typically related to the discharge from hospitals.

The collaboration and the division of labour between hospital and health and social care units vary from municipality to municipality and from one hospital department to another.

8.6.2.2 Rehabilitation facilities

The Swedish rehabilitation facilities do cover the range from acute hospital facilities, over specialised units within the hospitals, inpatient and outpatient hospital services, specialised rehabilitation centres and long term care facilities.

The county-wise organisation makes it almost impossible to sketch a clear picture on how these facilities play a role in the rehabilitation landscape. There are great local variations in the numbers of beds and rehabilitation practices.

Collaboration between services has been suggested as a means to increase effectiveness and reduce costs especially in the care and rehabilitation of long-term illness. In Sweden, a special legislation named SOCSAM was introduced in 1994, enabling financial collaboration between governmental and municipal authorities for crossing the boundaries between medical rehabilitation and social welfare related rehabilitation. But the development of really integrated seamless care is still to be debated.

In the more recent period the debate on coordination of care was partly driven by county council cost containment. There are considerable problems in the "grey area" where responsibility moves from county councils to municipalities. The municipalities claim that patients are now sent home "quicker and sicker" because counties have a financial incentive to discharge them as early as possible. Municipalities are sometimes unable to provide necessary medical care and they have no direct access to medical

facilities. The counties counter that municipalities are not providing enough elderly or long-stay beds and claim that one in ten hospital beds is still occupied by someone who is medically ready to be discharged and who should be treated in primary care or at home. In 2004, a committee delivered recommendations on improving the boundary between health and social care, and proposed putting a greater responsibility on municipalities to provide integrated social and health care while giving them the ability to hire their own doctors if they feel that the counties are not allocating enough physician time to municipal home care (SOU, 2004).

8.6.2.3 Financing rehabilitation

The financing of the post-acute stroke rehabilitation centres is organised in a fixed budget system. (contrary to the acute sector that is financed on a DRG-system). Purchaser-provider negotiation decide on the amount of care there will be offered for the budget. The budget includes infrastructure; e.g hospital beds, cleaning etc, staffing, extra examinations (such as a new MR examination), training equipment for use at the hospital.

Specifically for rehabilitation, a Nordic European pilot study (in which Swedish teams participate) aims at integrating functional status measures based on ICD-10 coding, (including a critical analysis of ICF, FIM, FRG, AN-SNAP). The project aims at developing a method to measure activity and participation of the patient on special care. But a real wide scale implementation of the ICF is not realised yet. For ICF to become used more widely there is a consensus that more developed guidelines are needed as a complement to the classification.

There Nordic work group is also developing reflections on how to link between acute inpatient care and rehabilitation and will develop a proposal for rehabilitation in 2007. There is yet no link with the current NordDRG systemoo..

8.6.3 Quality

The National Board of Health and Welfare issued a set of regulations on quality issues for all health services to develop continuous quality improvement. The regulations emphasize on monitoring and quality-improvement measures focusing on technical quality and safety and issues related to the people for whom health services are intended.

The National Quality Registers are used as supportive tools for analyses of the medical quality and outcomes in specific parts of the healthcare system. The national quality registers mainly cover highly specialised care provided at hospitals, whilst primary health care largely lacks joint follow-up systems. Standardised patient questionnaires are used and Safety problems and shortcomings in care are registered, e.g. by the Medical Responsibility Board, Patient Insurance Fund, and in the National Board's Risk Database. Data from National Health Data Registers can be used to monitor health care utilisation, morbidity and mortality on a population level. Some 40 national health care quality registers, are developed each containing data on health care outcomes and treatment for a large number of categories of illness. These registers serve as a knowledge base for continuous improvement.[190, 191]

Although the prerequisites for monitoring the quality of care in Sweden are good, further development of models and methods for performance assessment are needed. Sweden has for instance no databases and quality indicators in primary care and care for many chronic diseases and psychiatric disorders. Hence, the quality of services cannot be defined for a large proportion of health services delivered.

In 2001, the National Board of Health and Welfare, jointly with the Federation of Swedish County Councils and the Swedish Association of Local Authorities started a reflection on a comprehensive and coherent system for review and for exchanging and maintaining information within treatment and care. Part of the exercise also focussed on

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oo www.nordclass.uu.se/verksam/norddrge.htm

the development of Quality Indicators. Quality indicators will be used to assess and compare the results of treatment and care, and for reviewing operations. Quality indicators should give all stakeholder insight into health care practice.

The model is similar to that used in Dutch health care systems, and very much related to performance indicators.

However, the Swedish quality pilot projects pay a lot of attention to the needs at population, group an individual levels. A lot of attention is now going into the development of a registration, in which individual needs are assessed through scales or rating systems.

In rehabilitation issues, the future assessment will focus on functionality and will be compared to identified targets set in different stages. The electronic registration system of needs and targets, aims at providing documentation for decision-making on treatment and care, for reviewing and studying outcomes and as such as a quality tool at various levels (individual, operational, regional and national levels).

- **In Sweden, the organizational model of rehabilitation takes into account the level of specialisation and the needs of the population to provide rehabilitation care.**
- **Related to the important role of primary care, it is sometimes difficult to make a clear delimitation between rehabilitation in the health system (counties) and maintenance training and prevention of loss of function in the social system.**
- **Rehabilitation facilities cover the range from acute hospital facilities, over specialised units within the hospitals, inpatient and outpatient hospital services and specialised rehabilitation centres to long term care facilities.**
- **General regulations for health care emphasize on monitoring and quality-improvement measures focusing on technical quality and safety, and issues related to the people for whom health services are intended. National Quality Registers are used as supportive tools for analyses of the medical quality and outcomes in specific parts of the healthcare system. Reflections started on developing a model of quality indicators for the health care sector.**

8.6.4 Example: Lower Extremity Amputation

According to the Swedish National Board of Health and Welfare (SNBHW), more than 3000 patients undergo amputation annually in Sweden. The amputation rate increases with age, and most amputations are performed on patients over 60. After the operation some follow-up treatment, and some extensive rehabilitation and nursing care has to be organised. Sweden has no standard approach for this rehabilitation after LEA. Rehabilitation for LEA is offered in regional and University rehabilitation units. In general it are only those people for which prostheses are matched, that are referred to rehabilitation centres. Most of the (especially older) groups remain short time at the rehabilitation unit of the hospital, before returning home.

An older study [192] retrospectively scrutinized medical records of patients underwent major lower limb amputation during 1980-82 were. The records showed 131 amputations were performed in 106 patients at the district hospital and 22 amputations on 17 patients at the local university hospital, referral centre, altogether 57 men and 66 women. Of the amputees 47 per cent were older than 80 years. Final amputation level was above-knee in 61 per cent of the patients treated at the district hospital. For patients who came from and eventually returned to their own homes the mean hospital stay amounted to 184 days (postoperative deaths excluded). After amputation 26 patients were trained to wear a prosthesis and 16 of these used the prosthesis 2 years after amputation..

A more recent prospective study [193] described the overall treatment and outcome of patients who underwent major LEA. The study took place over a five year period in the

Health Care District of North-East Skane, Sweden for about 190 patients. Prostheses were delivered to 43% of all patients with primary amputations. These patients spent a median of 13 days at the orthopaedic clinic. 55 days at the rehabilitation unit.

A retrospective study [194] analysed medical and nursing records of 45 patients who had undergone LEA at Uddevalla General Hospital. Hospitalization, rehabilitation and nursing-related data related to subjects alive after 6 months were compared with data concerning those deceased during hospital stay and within 6 months after amputation. The aetiology of the diagnosis leading to the LEA was cardiovascular disease in the majority of cases. The most common amputation level was below the knee. The patients surviving after 6 months had permanent problems in the area of nutrition, elimination, skin ulceration, sleep, pain and pain alleviation. The patients who died during the hospital stay had problems in all these areas.

8.6.5 Example: stroke[pp]

Although the organisation models can differ per county, rehabilitation of stroke patients is organised according to an overall general approach in Sweden The general approach follows the process outlined in the Evidence based national guidelines for stroke care, issued by the Swedish Board of Health and Welfare. The board monitors the quality of care and whether the correct measures are taken to implement the guidelines.

A vast majority of the stroke patients are discharged home. Depending on their needs the rehabilitation process is continued in ambulatory form at hospitals in case of comprehensive needs. If the patient is referred to a nursing home, the rehabilitation is continued at a low level by the paramedical staff attached to that facility. For those patients directly returning home from a stroke unit, and needing further rehabilitation, the health services of the municipalities are taking charge of the rehabilitation.

A smaller group (around 9% of the total) of stroke patients is referred to post-acute inpatient rehabilitation units within the hospitals. That can be general mixed neurological rehabilitation units (serving both TBI (about 25%) and stroke (about 60%)) or general geriatric rehabilitation units.

The quality approach in stroke rehabilitation is supported by a tradition of stroke registration[qq].The steering committee for "Riks-Stroke", frames and outlines quality indicators reflecting structure, process and outcome. All hospitals in Sweden admitting patients with acute stroke (85) participate since 1998. Annually, each hospital receives a written report in which the local results are compared with the national data and with comments and suggestions on improvements for the care. Data collection includes information on the patient's gender, age, history of previous stroke, life situation prior to the current stroke and level of mobility and need of assistance in three ADL functions, namely dressing, bathing, and going to the toilet. Items related to acute care include, the time from the onset of symptoms to admission to hospital, type of department to which the patient is admitted (medical, neurological or geriatric), whether or not the unit has organized stroke care (stroke unit), the patient's level of consciousness on admission, whether or not a CT-scan was done, and, in patients who died, whether or not an autopsy was done. In addition, drug treatment during the acute phase has been added since 1998. Items registered at discharge included: the duration of the acute admission to hospital; diagnosis of the stroke subtype, the patient's status at discharge (alive or dead), details of further management (at home or in an institution) and whether or not they required further care in an institution. A 3-month follow-up of the patients is included [195].

Results from Riks-Stroke show that women, in comparison with men, are more often living in institutions three months after stroke. Women also less often receive secondary stroke prevention.[196, 197]

[pp] the information is based on a personal communication of Prof. Katharina Stibrant Sunnerhagen, Insitute of Neuroscience and Physiology - Rehabilitation Medicine The Sahlgrenska Academy Göteborg University, SWEDEN

[qq] www.riks-stroke.org

Research using the stroke register has demonstrated that there are wide variations between hospitals in the proportion of patients admitted to a specialised acute stroke unit (more than one quarter of all stroke patients do not receive care in a stroke unit), variations in secondary prevention (Wide variations in the use of oral anticoagulants in stroke patients with atrial fibrillation, between hospitals), but also between counties and health care regions and in the proportion of patients in institutional care at 3 months. [198 , 199, 200]

A separate registration initiative for inpatient rehabilitation has been initiated by the Swedish Association of Rehabilitation and Physical Medicine. This registration focuses on all aspects related to inpatient rehabilitation activities and patient profiles. The purpose of the register is to improve the quality of care for the persons and has been in work since 1998 with annual reports. The register is now transferring to a web based modality, where the unit can get momentary feed back on the data entered. The data include demographics, mismanagement during the stay (falls, UTI, pressure sores etc), available rehabilitation resources, identification of functional limitations according to the ICF, ADL function, rehabilitation plan, quality of life etc and a follow up at one year checking the follow up of the rehabilitation plan.

8.7 US

8.7.1 Health care organisation in general

Health care policy in the US is based on completely different principles than the European welfare regimes. Especially the health insurance logic is not based on the well-known European variants of solidarity based Bismarck or Beveridge state insurance models. It is precisely this health insurance model that has a major impact on the organisation of health services.

8.7.1.1 Health insurance

The types of health insurance are group health plans, individual plans, workers' compensation, and government health plans such as Medicare and Medicaid.

About 2/3 of the American population is privately insured, often through collective employers insurances. The benefit packages are the result of negotiations and premiums paid. About one quarter of the population is insured through public programmes, especially focussing on elderly and poor people (Medicaid, Medicare). Some public insurances aim at particular groups (children, military personnel, agricultural sector,…). These last programmes will not be discussed.

A large part (about 70%) of the inpatient rehabilitation services is organised in the context of medicare payment policy, which is to a large degree operating under control of the federal government.

FEE-FOR-SERVICE

Health insurance can be classified into fee for-service (traditional insurance) and managed care. Both group and individual insurance plans can be either fee-for-service or managed care plans.

Fee-for-service plans traditionally offer greater freedom when choosing a health care professional. In a Fee-for-service model the insurance company reimburses the doctor, hospital, or other health care provider for all or part of the fees charged. A premium is paid and there is usually a yearly deductible (an amount specified by the terms of the insurance policy), which means benefits do not begin until this deductible is met. After the person has paid the deductible the insurance company pays a portion of covered medical services.

MANAGED CARE

In Managed care plans (for both groups and individuals) a person's health care is managed by the insurance company. Managed care refers primarily to a prepaid health

services plan, often limiting a patient to health care professionals listed by the managed care insurance company. Approvals are needed for some services, such as visits to specialist doctors, medical tests, or surgical procedures. The highest level of coverage is only guaranteed for services from providers affiliated with their managed care plan.

The following are types of managed care plans:

- Health Maintenance Organization (HMO)
- Preferred Provider Organization (PPO)
- Point of service (POS)

Health Maintenance Organization (HMO) is a type of health care plan where members pay a flat monthly rate to have access to a specified group of medical professionals. Members are limited to this group of participating providers and must see a primary physician to have access to any specialized medical service. HMOs are usually associated with specific geographical areas. It is actually a form of health insurance combining a range of benefits in a group basis. A group of doctors and other medical professionals offer care through the HMO for a flat monthly rate with no deductibles. However, only visits to professionals within the HMO network are covered by the policy. All visits, prescriptions and other care must be cleared by the HMO in order to be covered. A primary physician within the HMO handles referrals.

The HMO is the primary provider of managed care, and it does so in four basic models sharing one important feature: the health care providers may not bill patients directly for services rendered, and must seek any and all reimbursement from the HMO.

A PPO combines the benefits of fee-for-service with the features of an HMO. If patients use health care providers from a PPO network, they will receive coverage for most of their bills after a deductible and, perhaps a copayment, is met.

A PPO contracts with individual providers and groups to create a network of providers. Members of a PPO can choose any physician they wish for medical care, but if they choose a provider in the PPO network, their co-payments—predetermined fixed amounts paid per visit, regardless of treatment received—are significantly reduced, providing the incentive to stay in the network. No federal statutes govern PPOs, but many states do regulate their operations.

Point of service systems (POS) is actually an integrated form of HMO and PPO. It is an insurance model in which the benefits are dependent on the role of a gatekeeper, that authorizes wheter certain health services can be used. The model is based on a model of network health care providers. If the patients chooses a provider outside this network, a higher out-of pocket part will be paid.

MEDICARE/MEDICAID[rr]

Medicare is a programme under the U.S. Social Security Administration that reimburses hospitals and physicians for medical care provided to qualifying people over 65 years old, for some younger individuals who have disabilities and for people who have end-stage renal disease. Enrolled individuals must pay deductible and co-payments, but much of their medical costs are covered by the program. Medicare is less comprehensive than some other health care programs, but it is an important source of post-retirement health care. Medicare is divided into three parts. Part A covers hospital bills, Part B covers doctor bills, and Part C provides the option to choose from a package of health care plans.

Medicaid is a program funded by the federal and state governments, which pays for medical care for those who can't afford it. It reimburses hospitals and physicians for providing care to qualifying people who cannot finance their own medical expenses.

Supplemental insurance covers expenses that are not paid for by a person's health insurance.

[rr] http://www.cms.hhs.gov/

Health care policy making and organisation.

Health care is provided by a diverse array of entities:

- nonprofit health care provider (generally hospitals) operated by local or state governments, religious orders, or independent nonprofit organizations.
- for-profit health care providers (hospitals), which are usually operated by large private corporations.

There are many outpatient clinics which may be operated by any of the above organizations or may be a partnership of health care professionals (essentially a large medical or dental group). There are some health care professionals who individually, or in a group, practice for personal profit.

The provision and consumption of health and social care, is very much affected by the health insurance model, and the schedule of benefits it guarantees. Centres for medicare and Medicaid provide health care services for people falling under respective categories:

- **Health care policy in the USA is based on completely different principles than the European welfare regimes. Public and private insurance only covers about 85% of the population.**
- **Some groups have access to publicly financed programmes: Medicaid serves the poor, Medicare serves the severely disabled and people above 65.**
- **Services depend on the type of insurance coverage. There are different models of health insurance.**
- **The insurers (of which the federal government is the largest) are the purchasers of health care services. The provision depends on negotiations.**
- **Health care is provided by both for profit and non-for profit and public facilities.**

8.7.2 Rehabilitation

8.7.2.1 The underlying conceptual ideas

On the policy level, there is very little explicit conceptual reflection on the content and organisation of rehabilitation, as the organisational model is generally "left to the market". However, some implicit ideas can be found when looking at the different facilities playing a role in rehabilitation.

8.7.2.2 Rehabilitation facilities

The following settings provide postacute care rehabilitation services:

- Acute inpatient intensive rehabilitation services
- Skilled nursing units (facility with a subacute unit)
- Skilled nursing facility (nursing homes)
- Inpatient rehabilitation facilities

Acute intensive rehabilitation is provided under the general or direct supervision of a physician and is intended to help the physically or cognitively impaired patient to achieve or regain his/her maximum potential for mobility, self-care, and independent living in the shortest possible time. Acute inpatient intensive rehabilitation services are covered services only when provided to a patient admitted to an acute care bed. It generally is offered in a section of a hospital which is licensed to provide skilled nursing services for longer periods of time than the usual hospital stay.

Skilled nursing units (SNU) are based in hospitals, either housed inside the hospital or in a separate building. They typically provide only short term care and rehabilitation services. The skilled nursing unit does not have a separate license because it is part of a licensed hospital. They are sometimes called Step-Down Units, to reflect the fact that patients are moved there subsequent to the original hospital stay, once hospital level care is no longer required. These units provide sub-acute care, a level of care "between hospital and home". This form is also offered in skilled nursing facilities. It is care for patients of all ages who have been discharged from a hospital but need rehabilitation or complex medical services for recuperation before they can return home. Specialized, short term services may include extensive wound care, cardiac or stroke rehabilitation, intensive rehabilitation following joint replacement, multiple fracture or trauma rehabilitation, medically complex care and pain management. The goal of subacute care is to prepare patients to return home after restoring their mobility and independence.

Nursing Homes - also called Residential Health Care or Skilled Nursing Facility: is the general term for facilities offering long term nursing care. A freestanding SNF is a nursing home that provides skilled nursing care and is not attached to a hospital. A hospital-based SNF is a unit of an acute care hospital, and does not fall under the group of nursing home facilities.

Residents are admitted from their homes, other health care facilities and hospitals. It provides multi-disciplinary care to maintain residents at their highest functional level. A skilled nursing facility can serve for those who need short-term care following a hospital stay or long-term nursing supervision because of health issues or disabilities. Each facility defines its own level of care; not all facilities accept residents with complex medical problems.

- SKILLED NURSING FACILITIES (SNF) are licensed to provide twenty-four hour nursing care. Skilled nursing facilities are required to provide medical, rehabilitative and personal care.
- SKILLED NURSING FACILITIES - DISTINCT PART (SNF-DP) are skilled nursing facilities, which are a distinct part of an acute care hospital. In general, persons are admitted to these units from the acute care units of hospitals.
- SKILLED NURSING FACILITIES-SPECIAL TREATMENT PROGRAM (SNF-STP) are skilled nursing facilities with a special treatment program such as providing treatment to the mentally ill.

Inpatient rehabilitation facilities (IRF) can be independent or hospital based, but the vast majority (about 80%) is hospital based. IRFs provide intensive rehabilitation services—such as physical, occupational, or speech therapy—in an inpatient setting. Beneficiaries generally must be able to tolerate and benefit from three hours of therapy per day to be eligible for treatment in an inpatient rehabilitation facility. Medicare is the principal payer for IRF services.

To qualify as an IRF for Medicare payment, facilities must meet the Medicare conditions of participation for acute care hospitals and must meet all of the following additional criteria:

- have a preadmission screening process to determine that each prospective patient is likely to benefit significantly from an intensive inpatient rehabilitation program;
- have close medical supervision by a physician with experience or training in rehabilitation;
- have a director of rehabilitation, with training or experience in rehabilitation of patients, who provides services in the facility on a full-time basis;
- provide 24-hour rehabilitation nursing;
- use a coordinated multidisciplinary team approach;

- expect significant practical improvement for patients;
- have realistic goals for treatment aims; and
- each year, have no fewer than 75 percent of all patients admitted with 1 or more of 13 specified conditions.

The 75 percent rule allows inpatient rehabilitation facilities to admit 25 percent of cases without the specified diagnoses, so IRFs may treat some cases with diagnoses not compliant with the rule without financial penalty. The purpose of this 75% rule is to ensure that IRFs are primarily involved in providing intensive rehabilitation services. [ss]

The diagnoses included in the 75 percent rule, were also known as the Healthcare Financing Administration–10 (HCFA–10) These criteria were redefined in 2004 in the CMS conditions (Stroke, Brain injury, Amputation, Spinal cord, Fracture of the femur, Neurological disorders, Multiple trauma, Congenital deformity, Burns: The original HCFA condition "polyarthritis" was redefined as: Osteoarthritis (After less intensive setting); Rheumatoid arthritis (After less intensive setting) Joint replacement (Bilateral, Age ≥85, Body mass index ≥50) and a seperate condition Systemic vasculidities (After less intensive setting).

This change contributed to the reduction in the volume of patients admitted to IRFs. The most common rehabilitation condition for Medicare beneficiaries in 2004 was joint replacement, followed by stroke and hip fracture.

8.7.2.3 Indication setting

For IRF one of the Medicare conditions is that a preadmission screening process to determine that each prospective patient is likely to benefit significantly from an intensive inpatient rehabilitation program. The purpose of prior authorization is to validate that the service requested is medically necessary and meets criteria for reimbursement. Prior Authorization does not automatically guarantee payment for the service; payment is contingent upon passing all edits contained within the claims payment process; the recipient's continued Medicaid eligibility; and the ongoing medical necessity for the service being provided. Prior Authorization requires a written initial physician certification upon admission to Intensive Rehabilitation Services.

Medicare-medicaid agencies operate with interqual criteria.[tt] InterQual Criteria are sets of clinical indicators, that consider the level of illness of the patient and the services required The criteria are grouped into 14 body systems, and there are 3 sets of criteria for each body system: Intensity of Service, Severity of Illness Discharge Screens. Intensity Severity Discharge (ISD) Level of Care Criteria are used to determine the appropriateness of admission, continued services, and discharge, across the continuum of care. ISD uses objective, clinical indicators to determine the proper level of care, based on the patient's severity of illness and service requirements, and to suggest an appropriate care setting

8.7.2.4 Financing in rehabilitation

The Balanced Budget Act of 1997 mandated use of a prospective payment system (PPS) to pay for Medicare patient stays at inpatient rehabilitation facilities (IRFs) and stated that payment amounts should accurately reflect changes in IRFs' patient case mix.

The Centers for Medicare and Medicaid Services (CMS) implemented the Inpatient Rehabilitation Facility (IRF) Prospective Payment System (PPS) beginning on January 1, 2002. Before January 2002, Medicare paid IRFs under the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA), on the basis of their average costs per discharge,

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[ss] for details see http://www.cms.hhs.gov/InpatientRehabFacPPS/LIRFF/list.asp#TopOfPage
http://www.cahf.org/public/consumer/medicare.php

[tt] http://www.interqual.com/IQSite/about/history.aspx

up to an annually adjusted facility-specific limit. As of 2002, these facilities are paid entirely at prospective payment system (PPS) rates. uu

Under this PPS, IRFs are compensated for providing inpatient rehabilitation care based on a pre-determined amount per case according to the patient's impairment, age, level of function and co-morbid conditions. Patients are assigned to one of more than 300 case-mix groups (CMGs) based on their characteristics—a diagnosis that requires rehabilitation, functional status, cognitive status, age, and comorbidities—as recorded in the IRF patient assessment instrument.

Payments to IRFs are also adjusted to account for additional costs due to certain facility-level characteristics, namely costs due to geographic wage index differences, rural location, and low-income patients.

The unit of payment in the IRF PPS is a Medicare-covered hospital stay, beginning with an admission to the rehabilitation hospital or unit and ending with discharge from that facility. Each case will be classified into a Case Mix Group. The IRF PPS utilizes a patient assessment instrument (IRF PAI), to classify patients into distinct groups based on clinical characteristics and expected resource needsvv . The FIM data set, measurement scale and impairment codes incorporated or referenced in the IRF PAI. This payment will be increased for outlier cases. Also, short-stay transfer cases will receive a payment for each day in the hospital plus a case-level payment equal to one-half of one day's payment. But research already demonstrated the necessity to refine the instrument to predict costs.[201 , 202 , 203]

Providers of skilled nursing services must comply with both the Prospective Payment System (PPS) eligibility criteria and the Medicare technical eligibility criteria. The PPS criteria are focused on the resources used in the care of the resident. The basic principles of PPS are comparable to those for IRF. The PPS reimbursement is an all-inclusive per diem rate. This rate is predetermined, adjusted for geographic differences in labour costs and case-mix. Adjustment for case-mix is based on the Resource Utilization Groups (RUGs). RUG is a system identifying 53 groups based on patient characteristics (e.g. presence of medical conditions and ADL score) and service use[ww].

A rather important discussion at the beginning of this century, lead to an assessment of payment adequacy of the IRF. [204] The major emerging issues from this assessment were: it is very difficult to assess who needs intensive rehabilitation in an inpatient setting, and maybe there is an opportunity to transfer people faster to other types of rehabilitation setting, for the follow up (outpatient, homecare, SNF) but it lacks clear tools to assess whether patients are treated in an appropriate setting. This issue of access and transfer is considered as an important one, though as rehabilitation can also be offered in other types, and less expensive facilities. The introduction of the new PPS seems to indicate that the length of stay within the IRF's continues to reduce, while the medical outcomes remain comparable. Interesting is that the introduction of the PPS clearly lead to an increase in cost per case.

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uu http://www.washingtonwatchdog.org/documents/fr/01/au/07/fr07au01-17.html

vv http://www.cms.hhs.gov/InpatientRehabFacPPS/04_IRFPAI.asp#TopOfPage

ww http://www.physiciansnews.com/business/804campbell.html
http://www.medpac.gov/publications/other_reports/Sept06_MedPAC_Payment_Basics_SNF.pdf

8.7.3 Quality

An overview of quality and outcome measures for rehabilitation can be found[xx].

The Federal Agency for Healthcare Research and Quality (AHRQ) of the Department of Health and Human Services is responsible for measuring the quality of health care in the United States. Since 2003, a yearly report, 'the *National Healthcare Quality Report*', has been issued on quality of services. At this stage, the clinical conditions discussed in the reports are not specifically linked to rehabilitation (e.g. cancer, diabetes, end-stage renal disease, HIV and AIDS, mental health) but it is intended to update the set of measures.

Quality of care in rehabilitation is not uniformly assessed across the United States and a variety of measurements is in use. The American Academy of Physical Medicine and Rehabilitation suggested five performance measurements which are focused on the level of the setting or the health care professional and are organized by external institutesyy

The Commission on Accreditation of Rehabilitation Facilities (CARF), accredits the services of an organization based on preset standards. These differ by pathology (e.g. spinal cord, brain injury) and facility (e.g. hospital, outpatient). In total, 23 different programs are identified in the area of medical rehabilitation for which accreditation can be requested. Medical Rehabilitation programs include treatments for people who have had a stroke, brain or spinal cord injury, or pain that cannot be controlled by medication alone. Medical rehabilitation also includes return-to-work programs or occupational rehabilitation, which helps people regain skills they need so that they can return to work after an injury or illness. An organization seeking accreditation for a medical rehabilitation program must demonstrate the following:

- Service design and delivery that focus on the needs of the persons served.
- Assignment of designated, qualified, competent personnel to provide medical rehabilitation services.
- Program accessibility and designation of space for the provision of medical rehabilitation services.
- Accomplishment of predicted outcomes.
- Partnership with the persons served in decision making and the development of goals.
- A system of accountability that measures the success of the medical rehabilitation program by evaluating the outcomes achieved by the persons served.
- External communication to a variety of stakeholders regarding program performance.

The organization is asked to demonstrate to a survey team conformance to standards highlighting the organization's values and approaches in these areas. CARF standards are developed and revised through a series of panels, national advisory committees, focus groups, and field reviews:

- Core values and mission.
- Input from the persons served and other stakeholders.
- Individual-centered planning, design, and delivery.
- Rights of the persons served.

[xx] http://www.emedicine.com/pmr/topic155.htm
[yy] http://www.aapmr.org/hpl/perfmeasure/pmr.htm

- Continuity of care.
- Quality and appropriateness of services.
- Leadership, ethics, and advocacy.
- Planning and financial management.
- Human resources.
- Accessibility.
- Health and safety.
- Outcomes management and performance improvement.
- Infrastructure management

The Ambulatory Care Quality Alliance (AQA) provides a list of 26 quality indicators for peer review between settingszz.

The Joint Commission on Accreditation of Healthcare Organizations provides different core measure sets. Organizations enlisted in the program are enabled to compare their own performances with their peers. On the level of the health care professional, two performance measures are suggested. First, there is the 'Centers for Medicare and Medicaid Services – Physician Voluntary Reporting Program'. A list of 16 measures is asked to be reported which serve as a base for comparison between peers.

The 'Physician Consortium for Performance Improvement' which is part of the American Medical Association selected 96 performance measures on 17 clinical topics. As with the other systems, the variables are selected from electronical patients' records and entered in a uniform database. Registered members have privileged access to the database to compare their own data with blinded grouped data from their peers.

As mentioned before, many other institutes provide similar services and are mainly based on the sample principle of comparison between peers.

zz http://www.aqaalliance.org/performancewg.htm

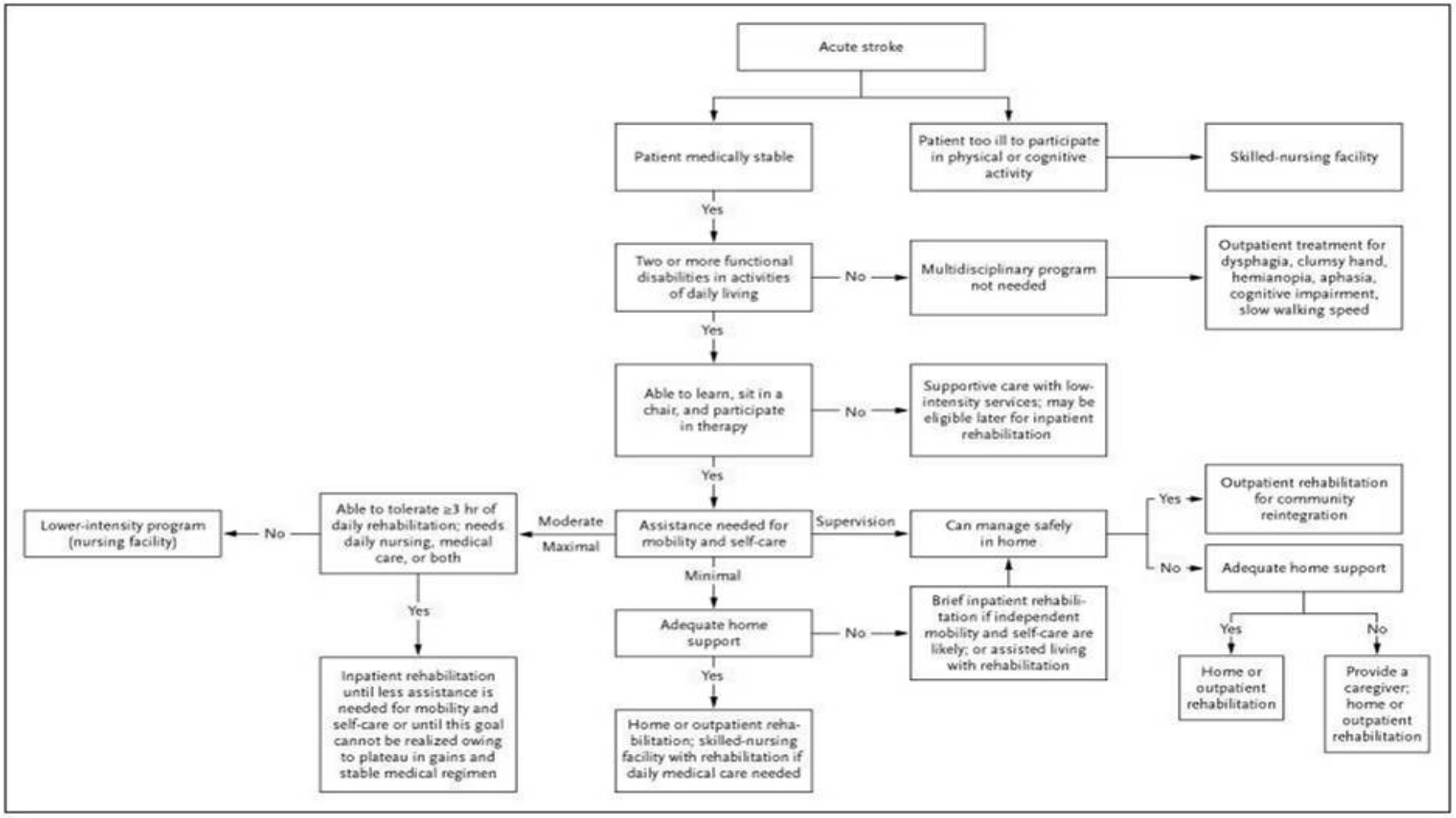
- **In the US, different facilities provide post-acute care rehabilitation services: Acute inpatient intensive rehabilitation services; Skilled nursing units (facility with a subacute unit); Skilled nursing facility (nursing homes); Inpatient rehabilitation facilities.**
- **The vast majority of IRF's are hospital based.**
- **To qualify as an IRF for Medicare payment, facilities must meet Medicare conditions of participation for acute care hospitals and some additional criteria of which the most important is to have a preadmission screening process to determine that each prospective patient is likely to benefit significantly from an intensive inpatient rehabilitation program. Medicare IRF should have no less than 75 percent of all patients admitted with 1 or more of 13 specified conditions.**
- **A prospective payment system (PPS) is used to pay for Medicare patient stays at inpatient rehabilitation facilities. IRFs are compensated for providing inpatient rehabilitation care based on a pre-determined amount per case according to the patient's impairment, age, level of function and co-morbid conditions. The unit of payment in the IRF PPS is a Medicare-covered hospital stay (from admission to discharge).**
- **For skilled nursing services the basic principles of PPS are comparable to those for IRF.**
- **The IRF PPS utilizes a patient assessment instrument (IRF PAI), to classify patients.**
- **Some initiatives exist on quality measures, but Quality of care in rehabilitation is not uniformly assessed across the United States and a variety of measurements is in use.**
- **The Commission on Accreditation of Rehabilitation Facilities (CARF), accredits the services of an organization based on preset standards.**

8.7.4 Example: Stroke

Accurate information on the current systems in stroke rehabilitation is difficult to obtain because the different health care providers, private and public, are not equally sharing their information [205].

Post-acute care can be provided by home health agencies (HHA), skilled nursing facilities (SNF), inpatient rehabilitation facilities (IRF) or long-term care hospitals.[206] HHA mainly provides therapy, nursing care and assistance from home health aides[207]. The main difference between IRF and SNF is the intensity of rehabilitation. Patients are eligible to be admitted in an IRF if they can sustain 3 hours of therapy while in SNF less intensive therapy is provided. Long-term care settings are focused on the provision of nursing care or constant supervision.

FIGURE 8.2: USA: DECISIONS ON DISCHARGE DESTINATION FROM ACUTE STROKE CARE SERVICES INVOLVE THE CLINICAL EVALUATION[208] AS WELL AS SOCIAL INDICATORS OF THE PATIENTS[209]



The majority of the patients are discharged home (50,3%, 2000), followed by discharge to skilled nursing facility (21,0%).[210] However, also factors as geographical availability and the relationship between acute setting and IRF or SNF have been found to play a significant role in the decision on the patient being transferred to a SNF or IRF[207] The regional distribution of use of various types of post-acute care also shows much variation over the country.

For Medicare beneficiaries (not pathology specific), the use of SNF is the highest in West North Central, (61,8 discharges per 1000 beneficiaries in 1997) and the lowest in Middle Atlantic.[211] For IRF, the highest use was measured in West North Central, the lowest in Pacific. For stroke, different referral patterns were found across the country. For example, in 1998, 74,5% of the Medicare patients who suffered a stroke were admitted to a SNF or IRF while this was 62,6% in East and West South Central.[212] It was suggested that these differences were caused by several forces: practice styles, supply of services and local regulatory practices.

The median length of stay in inpatient rehabilitation setting (SNF and IRF combined) was 16 days in 2001 and significantly lower than in 1994 (26 days).[213] Additionally, large differences are found between the different systems of health care providers. A comparative study between IRF of the Veteran Affairs (VA) versus non-VA IRF revealed a higher length of stay, a higher functional outcome and lower community discharges in the VA-system.[214] Financial incentives to decrease the length of stay over time are considered as one of the main drivers behind this phenomenon. Ottenbacher et al.[213] found that this was accompanied with an increase of mortality in the post-discharge period. The authors could not pinpoint an explanation for this finding. The discharge destination from inpatient rehabilitation settings are mainly to the community (67%) or to a long-term facility care (12%).[215]

The presence of various health care systems and different stakeholders and agencies results in fragmented health care delivery leading to suboptimal treatments and inefficient use of resources.[216] The American Stroke Association's task force recognized this problem in a recent report[217, 218] and formulated recommendations to establish a more 'integrated system coordinating patient access to the full range of activities and services associated with stroke prevention, treatment and rehabilitation,…' A general recommendation was that a stroke system should ensure effective collaboration between agencies. Also a standard approach in stroke care was recommended as well as performance measures on process and outcome of care should be identified. However, the recommendations lack the concrete suggestions how to establish such stroke systems.[219] In the meantime, it was suggested that international comparative research in stroke rehabilitation could offer opportunities to study different care systems in the efficiency[220].

8.7.5 Example: Spinal Cord Injury

In general terms, the care trajectory after the acute event of a spinal cord injury (SCI) goes through acute care into rehabilitation and further back into the community or to a setting of chronic care.

No indications were found on the eligibility of acute hospitals to admit SCI patients. However, due to the status of emergency, patients may mainly be transferred to acute hospitals providing tertiary or high secondary services, the so called 'referral hospitals'. These can provide care to patients with multi-system failure or in need of neurosurgery. The rehabilitation phase mainly follows subsequently the stay in the acute care setting. It is expected that the SCI patients will be mainly transferred to IRF settings. All IRF settings are eligible to admit SCI patients as there are no legislations in place which preset criteria. Moreover, SCI belongs to the list of 13 diagnostics eligible for the 75% rule in the PPS regulation implemented by CMS for IRFs.[221]

On the other hand, there are initiatives to facilitate rehabilitation settings to specialize in programs for SCI patients. First, there is the program of the Rehabilitation Services Administration, currently funded by the National Institute on Disability and Rehabilitation[222] It focuses on the development of a comprehensive service delivery system for patients with a spinal cord injury which also included a long-term follow after inpatient stay. In 1970, a first model spinal cord injury system (MSCIS) was granted. Since then, the number of hospitals that were offered support to further develop this integrative system was increased to 16 centers nationwide. Support is provided for five years. After each half a decade all hospitals need to reapply for this type of support.

This program also includes a collaborative national database on demographics and outcome after rehabilitation as well as information on follow-up status. Currently, data are available on 30.532 subjects[222] and one of the major strengths is the standardized collection of patient-related and injury related information.[223] The mean length of stay (LOS) in the acute care unit was 18 days in 2003 (most recent complete data). This represented a small increase since 1997 where the mean was 13 days. In most years, the LOS of patients with tetraplegia do not differ much with the average LOS of patients with paraplegia (19 days vs. 16 days, respectively). Mean LOS in rehabilitation was measured at 45 days. In 1974, this was 115 and has declined since then. In contrast with the acute stay, large differences are found in average LOS between tetraplegic and paraplegic patients. The mean LOS of patients with tetraplegia was measured at 51 days while patients with paraplegia had a mean LOS of 36 days in the rehabilitation unit.[224]

Accreditation can be considered as a second initiative to facilitate rehabilitation settings to provide a specialized, integrative program. In total 90 centers are certified by CARF fulfilling the requirement in excellence of practice.[aaa]

The discharge destination after the rehabilitation phase is mainly the private residence (88.1% (NSCISC data) and 92% [3]) followed by nursing home (4.1%).

Besides the MSCIS, no other information on establishing formal networking across settings was found. The trajectory of care is mainly driven by the freedom of choice, moderated by insurance regulations. In a system of 'fee for service' the patients have more complete freedom to choose their own providers of care. In models as 'Managed Care Organizations', 'Health Maintenance Organizations' and 'Point of Service Organization' the policyholder is limited in choosing health care providers by the list of preferred providers determined by the insurer.

[aaa] . http://www.carf.org

8.7.6 Example: Total Hip Replacement

Prior to the introduction of the pre-paid system, patients undergoing total hip replacement remained in the acute hospital until they could be discharged home. Due to the increasing financial pressure on acute settings, leading to a reduction of length of stay, referral to inpatient rehabilitation services increased significantly as functional recovery was not established in the acute hospital.[225, 226] Rehabilitation is offered in various facilities: inpatient rehabilitation facilities (IRFs), Skilled Nursing Facilities (SNFs) or long-term care hospitals (LCTH).

Currently, referrals to post-acute facilities are not regulated and there are no criteria implemented defining patients eligible for particular services. Decision-making on discharge disposition is made by the physician in the acute hospital. In most cases, a discharge planner will be involved assuring a smooth transition into post-acute care setting. Percentages of patients being discharged to one of the post-acute services vary between 33% [227] and 58%[228], mainly depending on the age of the studied group. However, the specific destination is more influenced by non-clinical factors. In a recent study by Buntin et al.[207] availability of the post-acute facility as well as the network of the acute hospital were better predictors for discharge destination than any clinical indicator.

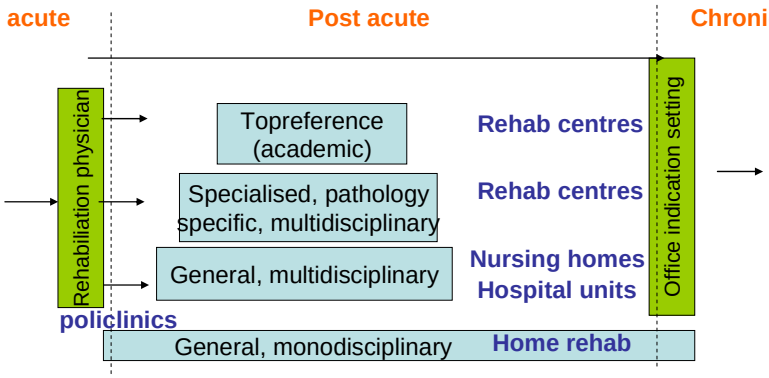
As service delivery varies largely between these post-acute facilities, it is expected that outcome will vary considerably. Recent studies showed superior outcomes for patients admitted to IRFs in comparison to SNF-patients.[229, 230] The hypothesis is made that this is due to the more intensive rehabilitation programs in the IRFs. The average length of stay varies between 10 days and 13 days mainly dependent on the need for revision surgery and age.[231, 232, 233]

8.8 INTERNATIONAL COMPARISON

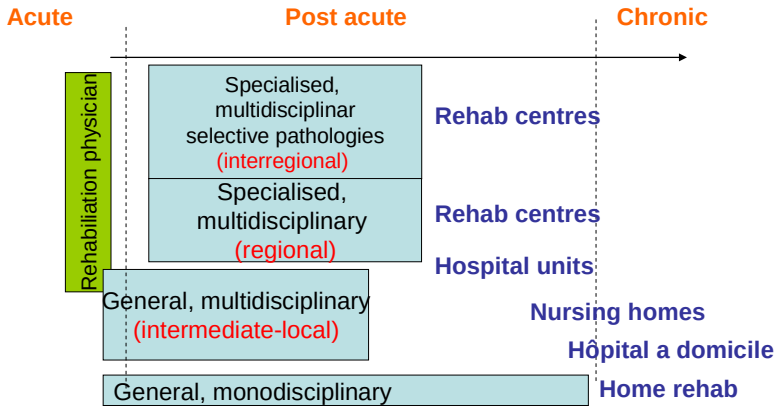
8.8.1 A basic schematic comparison of the different countries

Based on the information gathered we tried to schematically synthesise the organisation of musculoskeletal and neurological rehabilitation for the five different countries. As can be expected, we do not claim that these schemes cover al details and nuances. They are made as a tool for a quick comparison, and as a stepping stone for the recommendations in the final chapter.

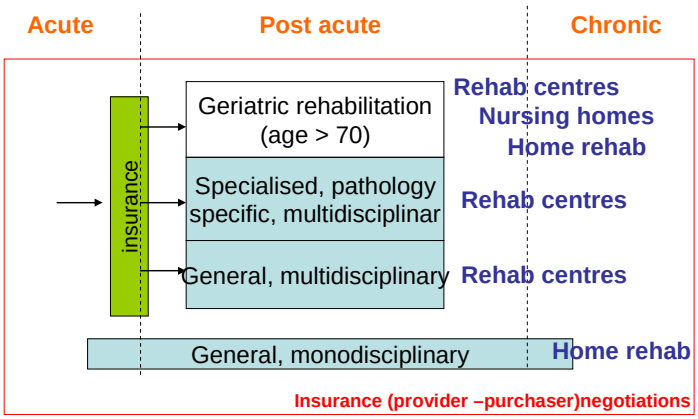
8.8.1.1 The Netherlands



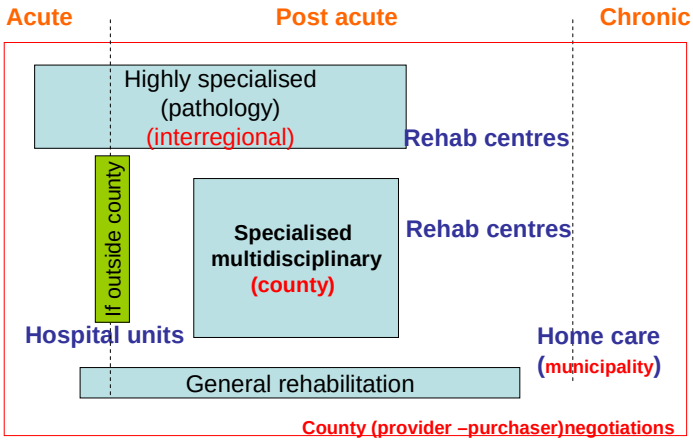
8.8.1.2 France



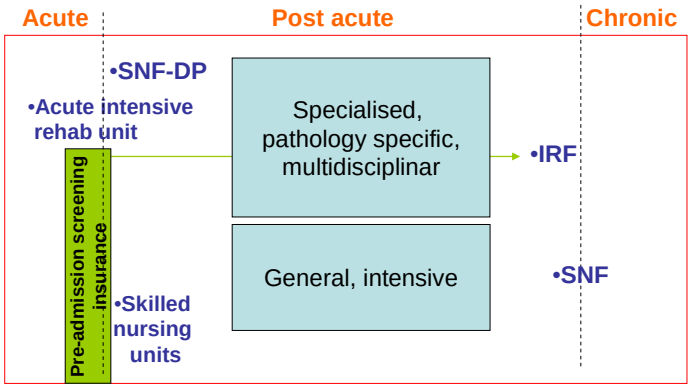
8.8.1.3 Germany



8.8.1.4 Sweden



8.8.1.5 USA, Medicare/Medicaid



8.8.2 Summary assessment

The organisation of rehabilitation facilities has to be understood against the background of historical policy choices in organisation, financing and health insurance issues, economic constraints and societal values and preferences of the entire health care system.

(Policy-)Reflections on the organisation of the rehabilitation sector, are being linked to conceptual issues about the role of rehabilitation. Policymakers are aware that more clear conceptual delineation of issues related to rehabilitation, is needed to streamline the health care organisation.

A well-defined framework for developing trajectories of care and integration of health services is not to be found in the countries studied. Although, it becomes apparent that similar reflections are taking place in order to realise an optimal use of the different kinds of health care services.

The debate about organising rehabilitation services is mainly focussing on the clear identification of the roles of services playing a role in acute care and treatment, rehabilitation and long term care.

In the different countries similar types of health services are identified as playing a role in rehabilitation. In general terms a distinction is accepted between different types of rehabilitation (related to the purposes and the patients (medical) needs).

The important challenge for most countries is now to identify timeslots for each phase and each type of rehabilitation care needed in these time slots. The criteria put forward to define the use of the facilities depend on the local availability of services, the rehabilitation purpose and the medical needs of the patient

All the countries studied struggle to translate the different dimensions of rehabilitation targets in organisational facilities. A clear trend is emerging however: rehabilitation policies focus on a clear delineation between the content (and intensity) of rehabilitation, the phases of rehabilitation and the aims of rehabilitation interventions, in order to identify the roles or organisations and providers. Moreover, these roles have

to be identified in the logic of "trajectories of care" with "phases" and fitting in organisational "networks" or "chains of care".

Some countries try to conceptually differentiate between "general rehabilitation", "general multidisciplinary rehabilitation", "complex multidisciplinary rehabilitation", and "top reference multidisciplinary rehabilitation". This distinction is based on the particular needs of the patients. Organisations and providers are being identified to fulfil tasks on this gradients. The planning of these centres is ought to be fitting with geographical and epidemiological characteristics. The functioning of these different types of facilities should be adapted to the logic of rehabilitation trajectories" in "networks" or "chains of organisations"

In all countries it can be observed that some centres function as "reference centres" for specific pathologies. They develop specific competences and knowledge related to specific disorders. However, these centres are not exclusive to a certain pathology. Neither does it mean that other centres cannot service similar pathology groups, especially if a limited number of rehabilitation centres serve a region. All centres offer rehabilitation support for different types of musculoskeletal and neurological problems (with maybe as a sole exception for MS).

In some countries the access to rehabilitation is controlled through the aims of rehabilitation. In Germany and the Netherlands, aged groups have a bigger chance to have a different facility providing (less intensive) rehabilitation.

Other facilities, can provide a certain level of medical and paramedical rehabilitation, but focus more on the longer term social aspects of rehabilitation. They mainly play a role in the provision of (inpatient or ambulatory) support for those who are unable to live independently.

9 RECOMMENDATIONS FOR ORGANISATION OF POST-ACUTE MUSCULOSKELETAL AND NEUROLOGICAL REHABILITATION IN BELGIUM

9.1 INTRODUCTION

9.1.1 Synthesis of the key points formulated during the study of the organisation and financing of musculoskeletal and neurological rehabilitation

The principal goal of this project is an assessment of the conventions 7.71 and 9.50. The analysis of the conventions 7.71 and 9.50 which include the financing of rehabilitation activities in a limited number of rehabilitation facilities, was extended with an analysis of K-nomenclature which includes a separate part of financing of rehabilitation activity. As for musculoskeletal and neurological rehabilitation specific facilities exist for hospitalised patients, an analysis of the financing of a hospital stay (Specialised beds for musculoskeletal S2 and neurological disorders S3) completed the study.

The current organisation of musculoskeletal and neurological rehabilitation in Belgium lacks transparency and clinical coherence. Several parallel payment systems exist which are mostly based on historical factors instead of criteria concerning patients' rehabilitation needs and goals.

One system is linked to hospital stay in specialised beds (Sp beds) for diagnosis and treatment of musculoskeletal (S2) and neurological disorders (S3). This financing system covers basic care needs and limited rehabilitation services.

Other systems are specifically linked to rehabilitation activities and concern mainly nomenclature (K, M and R) and rehabilitation agreements (also called conventions). These systems are fee for service systems. The different payment systems overlap significantly and can be combined. Price setting for each unit of payment, as well as per hour of therapy depends on the system and is mainly based on historical facts. There are no clear criteria for patient referral to the different types of rehabilitation organisations and the only characteristic on the limitative lists is the medical diagnosis. Patients' rehabilitation needs and goals are not formally assessed, neither are there criteria justifying an inpatient treatment.

The rehabilitation trajectory is often driven by the access of the different organisations to the different payment systems.

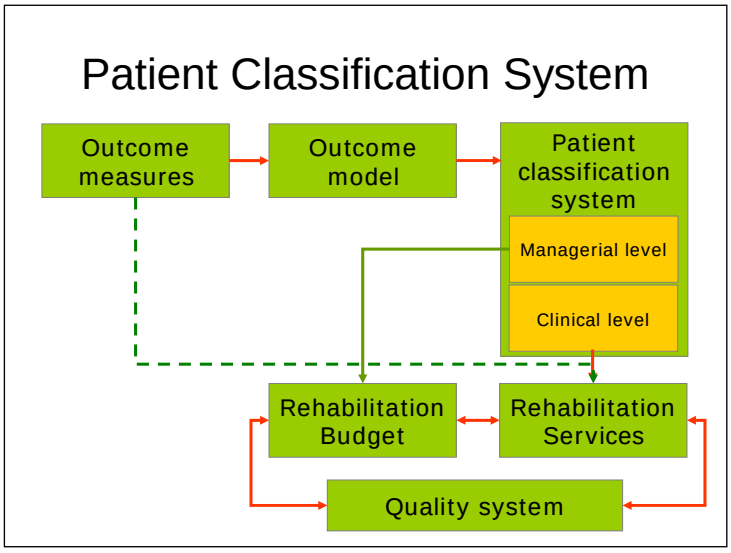
There is no systematic central and detailed registration of data concerning the performed rehabilitation activities. There is no accreditation system and only very limited formal quality control.

Current rehabilitation practice in Belgium shows a large variability concerning duration of the rehabilitation programmes (expressed as a number of treatment sessions), type of therapy (mono- versus multidisciplinary) as well as payment system (M- or K-nomenclature, 9.50 or 7.71 convention), at least for the five studied pathologies (LEA, MS, SCI, stroke and THR). The variability in rehabilitation programmes might be rather explained by the type of organisation regionally available and by the related payment system than by patient's rehabilitation needs and goals, because except for medical diagnosis, no patient referral criteria are available. The study of clinical pathways for these pathologies, yielding only limited information (see chapter 7), could confirm nor reject the variability in clinical practice.

A definition of rehabilitation was developed within the conceptual framework of the WHO International Classification of Functioning, Disability and Health (ICF). This conceptual definition has to be made operational in due time, by means of a patient

classification system (Figure 9.1). ICF can already be used as a conceptual framework for an outcome model but the application of ICF in clinical practice and for financing purposes only fits long term vision.

Figure 9.1: Principles of an ideal Patient Classification System



Outcome measures, outcome models and patient classification systems exist but are not explicitly linked.

The implementation of ICF as an outcome model depends on its compatibility with measures used in rehabilitation and the improvement of its applicability.

FIM and Barthel Index are tools measuring level of dependence related to activities of daily living. The results of this measurement can be used to estimate workload, but neither FIM nor Barthel Index measure rehabilitation needs.

In Belgium only MVG-RIM2 includes functional items. It could be considered to use the MVG-RIM2 as an intermediate profiling tool of post-acute rehabilitation, using the "fingerprints". However, the necessary reluctance is needed: MVG-RIM is not a tool enabling to score for paramedical (occupational therapy, physical therapy, psychology,…) activities, neither to monitor or assess the effectiveness of therapy or different aspects of rehabilitation activities. It could be an option to validate MVG-RIM2 with other instruments currently tested in other countries even though MVG-RIM2 will at the earliest be implemented in Belgium in 2008.

Organisation and financing of rehabilitation was analysed in five countries. All countries are struggling with these issues and developing new solutions.

In The Netherlands rehabilitation is organised within 4 levels and patients need an indication setting. There is basic set of performance indicators as well as a rehabilitation treatment framework, intended as quality and accreditation instrument.

In France rehabilitation is conceptually organised around three levels of care and has a clear regional orientation. There is no systematic model of indication setting.

Medical post-acute rehabilitation in Germany is mainly offered in specialised rehabilitation clinics, although outpatient and part-time inpatient care grows considerably. Approvals by the insurance companies for admission to rehabilitation facilities are needed. Quality assurance programs intend to impact on the allocation of patients as well as the financing of the rehabilitation services.

In Sweden rehabilitation is organised at county level, taking into account the level of specialisation and the population's needs. The rehabilitation has a clear orientation on home and ambulatory care, but a differentiation is made between at least two levels of facilities. The quality assessment is stimulated by both national health care agencies and

rehabilitation professionals. Registers are an important support tool in this quality approach.

In the US different facilities provide post-acute care rehabilitation services. A preadmission screening process is needed within Medicare as stays in a Medicare inpatient rehabilitation facilities (IRF) are funded by a prospective payment system. The unit-of-payment is a Medicare covered hospital stay. Patients are classified with a patient assessment instrument (IRF PAI). Quality of care is not uniformly assessed, although efforts are made to develop a quality approach based on registration. Services can be accredited by the Commission on Accreditation of Rehabilitation Facilities (CARF) based on preset standards.

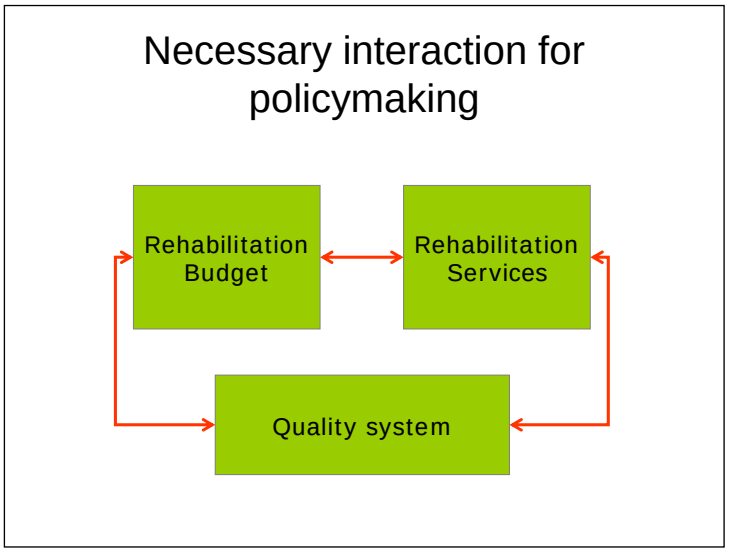
In this and the following chapters the organisation and financing of musculoskeletal and neurological rehabilitation in Belgium is discussed. This discussion is based on the input of national experts and elements from literature described in previous parts. Several models are proposed and recommendations applicable to the Belgian context are made.

9.1.2 Optimising the organisation and financing of post-acute musculoskeletal and neurological rehabilitation in Belgium

The current organisation and financing of musculoskeletal and neurological rehabilitation in Belgium requires an important revision. The conventions 9.50 and 7.71 have to be revised and elaborated in the context of an overall strategic vision on rehabilitation in the Belgian health care approach. In their current form the conventions do not differentiate enough from, or offer added value to K-nomenclature.

Belgian health care services are in general characterised by a wide accessibility and affordability by a universal social security system. The development of a vision on the organisation and financing of rehabilitation services and facilities should fit in this tradition. The new conceptual approach of rehabilitation should be built on the interaction between financing, organisation and quality of rehabilitation services (Figure 9.2). A line of reasoning developed in this chapter, takes these issues into account.

Figure 9.2: Interaction in policy making



Similar to international debates, Belgium needs to develop an explicit conceptual framework for the organisation of musculoskeletal and neurological rehabilitation. It is proposed to develop a stratified rehabilitation model in which the roles of rehabilitation organisations can be identified, taking into account characteristics of patients' needs, disease trajectories, rehabilitation goals and epidemiological and geographical needs. Resource allocation must become more transparent and related to the effective service delivery for particular patient characteristics.

9.2 ORGANISATION OF POST-ACUTE MUSCULOSKELETAL AND NEUROLOGICAL REHABILITATION

9.2.1 An organizational model for post-acute musculoskeletal and neurological rehabilitation in Belgium: different options.

Four dimensions are important when developing an organisational model for musculoskeletal and neurological rehabilitation:

- the *phase* (parts of the disease trajectory): acute, post-acute and chronic. We stick to a generalised division in three phases. For each particular pathology more detailed schemes can be developed (examples were given in the chapter international comparison phased model neurology, Dobkins model for stroke)
- the *setting*: inpatient versus ambulatory.
- the idea of a mono- or multidisciplinary approach is related to *human resources* issues
- the *complexity* of the rehabilitation needs and goals and thus of the required rehabilitation activities: simple or complex.

Since the study of other countries (see chapter 8) yielded no single organizational model, and since each model has advantages as well as disadvantages, several options will be given for the organization of musculoskeletal and neurological rehabilitation in Belgium. The policy options discussed in this chapter only consider the post-acute phase. Post-acute rehabilitation cannot be isolated from rehabilitation in the acute and chronic phase. The organisation and financing issues there are particular, and to far from the initial goal of this project.

9.2.1.1 A Stratified Rehabilitation Model

The conceptual stratified rehabilitation model for the post-acute phase is developed as a support tool for organising rehabilitation. Moreover, it tries to translate and optimise the existing informal organisation of musculoskeletal and neurological rehabilitation in Belgium.

Figure 9.3 visualises the ideas underlying this conceptual model.

This rehabilitation model is organised around three differentiated types of rehabilitation services, taking into account patients' rehabilitation needs and goals:

- General rehabilitation services
- Specific rehabilitation services
- Highly specific rehabilitation services.

The services of the different rehabilitation levels funtion in a collaborative way throug a clearly structured network. Between the different centres can be referred depending on the phase of the trajectory and when necessary considering geographical factors.

Two criteria are used for separating the levels in this structure:

- complexity of rehabilitation needs and goals
- incidence and prevalence of consequences of health conditions.

The implementation of this model thus requires a systematic assessment of patients' rehabilitation needs in the acute phase of the disease trajectory. It is recommended to keep in mind the framework of the International Classification of Functioning, disability and health (ICF) while performing this assessment. The value of this framework is generally accepted in rehabilitation medicine from a clinical point of view. However, it should be noted that ICF currently is not ready yet to be used as an organizational and managerial tool. The assessment should be based on diagnosis, required intensity of

care, rehabilitation needs and goals as well as on personal and environmental criteria. The assessment has to be repeated periodically and can result in a transfer of an individual to another type of organisation within the network.

This assessment is a crucial tool to assign a patient to a rehabilitation programme, which in turn is decisive for the referral to a certain type of rehabilitation organisation. Each rehabilitation facility offering rehabilitation programmes, will receive an adapted funding. Budget allocations can be more transparent and logic, and adapted to the resources required to offer a rehabilitation programme.

Of course, the assessment has to be perfomed by an objective but specialised professional. Several options exist. This assessor could either be the treating rehabilitation specialist in the acute phase, the rehabilitation specialist in the post-acute phase, a representative of the insurance organism, a completely independent party, or a collaboration between two or three of these parties. In chapter 8 several examples will be given in the studied countries. The better the PCS is conceived, the better chance there is for objectivity in the assessment.

The rehabilitation needs and goals will lead to a mono- or a multidisciplinary approach as is mentioned in the comments on the definition of musculoskeletal and neurological rehabilitation.

Another dimension is the complexity of the rehabilitation needs and goals.

Short-term (or temporary) rehabilitation needs and goals are considered as simple.

For example: rehabilitation in case of simple sport injuries, or after total hip, knee or shoulder replacement.

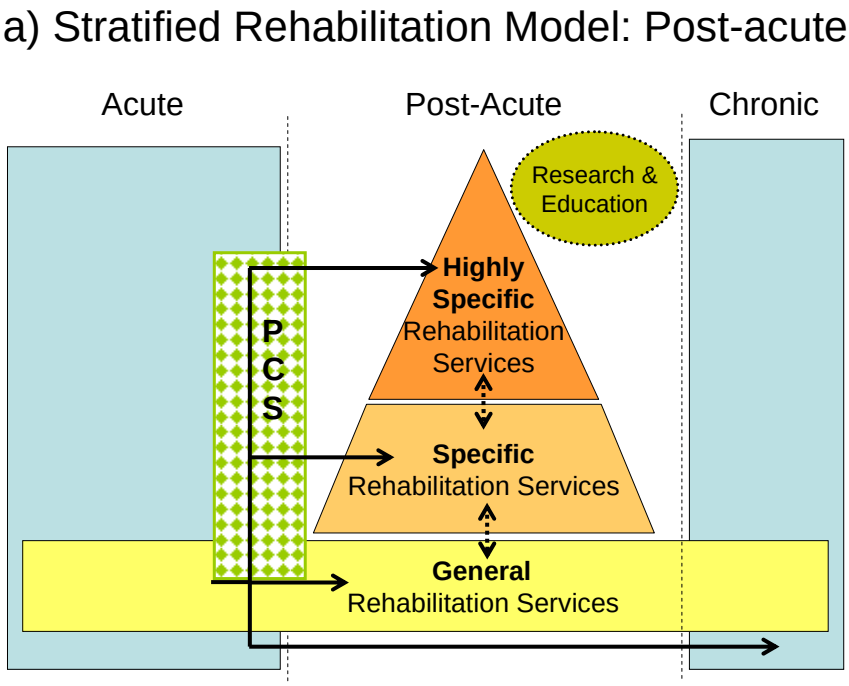
Long-term (or permanent) rehabilitation needs and goals are considered as complex.

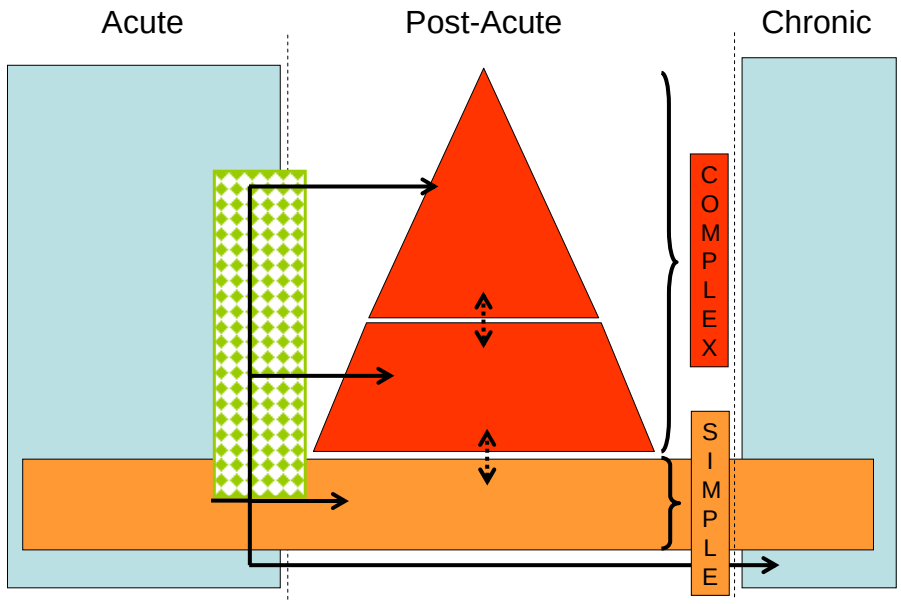
For example: rehabilitation in case of spinal cord injury or multiple sclerosis. Rehabilitation needs and goals in case of a health condition which often causes important long-term functional impairments but can partially recover such as stroke, Guillain-Barré syndrome and multiple trauma, are also considered as complex.

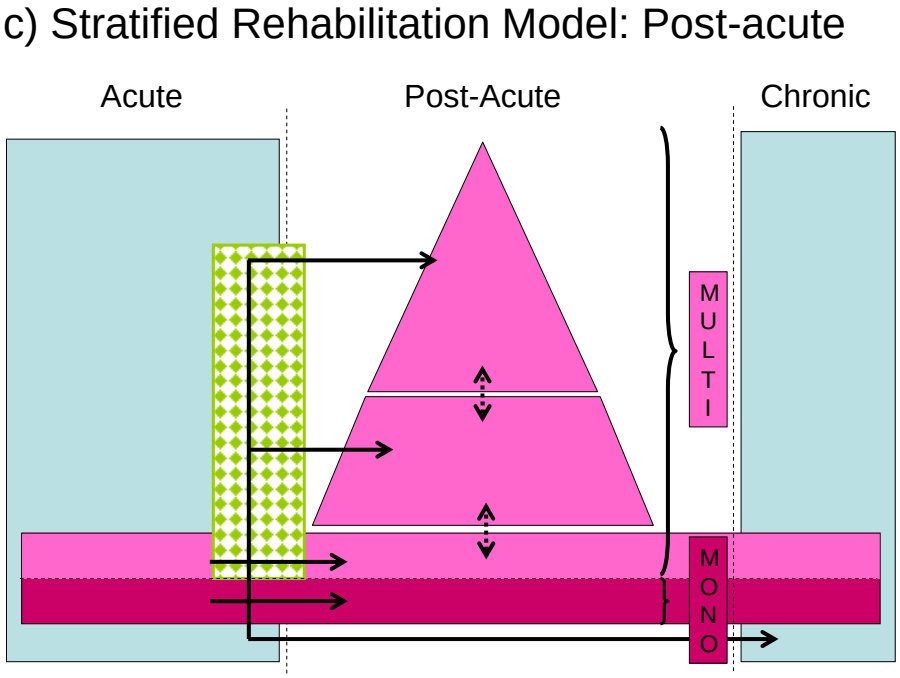
The model also takes into account options for hospitalised (inpatient) or ambulatory (outpatient) rehabilitation services. However, it is not clear yet neither in literature (See chapter 3), nor among experts in what conditions one can choose for hospitalised or ambulatory settings. This dimension is not visualised in the model.

The implementation of this model will require the implementation of an elaborated quality or performance assessment instrument, measuring at least the clinical patient outcomes of the rehabilitation process. An accreditation system could be an alternative (see CARF in the US).

Figure 9.3: a) Stratified Rehabilitation Model: Post-acute Phase; b) Visualisation of the dimension complexity of rehabilitation needs and aims; c) Visualisation of the dimension mono-disciplinary and multidisciplinary rehabilitation. Note: the dimension "hospitalized and ambulatory" is not visualized







GENERAL REHABILITATION SERVICES

As demonstrated in Figure 9.3: general rehabilitation services can be provided in the acute phase of the disease trajectory, in the post-acute phase after medical stabilisation, as well as in the chronic phase for maintenance rehabilitation or follow-up activities. All these organisations deliver services to patients with simple rehabilitation needs and goals. Besides, acute organisations assess patients with complex rehabilitation needs. Based on this assessment, patients can be referred to specific or highly specific rehabilitation services.

The final referral decision is made by the assessor as described above.

The general services can offer both mono- as well as a simple multidisciplinary rehabilitation. Mono-disciplinary rehabilitation services can be delivered by one or more ('multi-mono' or 'simple multi') individual therapists (working independently of each other), but belonging to a multidisciplinary team, part of a multidisciplinary organisation. This contrasts with multidisciplinary rehabilitation, which is offered by an interdisciplinary collaborative team. [bbb] In the general level, this multidisciplinary rehabilitation is less complex than in the specific and highly specific level.

These services will be provided in an ambulatory, outpatient setting. In case of a preceding acute care phase, inpatient services can be provided too (at the start of the rehabilitation process).

SPECIFIC OR HIGHLY SPECIFIC REHABILITATION SERVICES

Patients selected on clearly defined criteria for complex rehabilitation needs and goals, are only referred to specific or highly specific rehabilitation services. Patients affected by consequences of health conditions with a high incidence or prevalence, have access to specific rehabilitation services (e.g. stroke), whereas patients affected by consequences

[bbb] Note that therapy at home, delivered by an individual therapist, is called "home therapy" and is monodisciplinary. Post-acute rehabilitation is offered in a rehabilitation organisation, where a multidisciplinary team offers therapy in a coordinated way. In the post-acute phase, the team can offer multidisciplinary therapy, or one of the team members can offer monodisciplinary therapy, depending on the needs and goals for an individual patient.

of health conditions with a low incidence or prevalence have access to highly specific rehabilitation services (e.g. spinal cord injury).

(Highly) specific rehabilitation services are always provided by a multidisciplinary team at least composed of a physician specialised in rehabilitation and one type of therapist. These services can be provided in a hospitalised or ambulatory setting.

Referral between organisations providing specific and highly specific rehabilitation is possible and is based on a re-assessment with the same tools as used for the assessment at the start of the post-acute phase.

Facilities offering specific and highly specific services need more resources, because they will offer more intense and complex rehabilitation programmes. A prospective payment system with a closed-end budget is preferred, calculated on different components, and allowing a transparent price setting considering different elements needed for providing rehabilitation services. The budget allocation has to be supported by the use of performance or quality monitoring (see next paragraphs on financing and quality).

Research and/or academic functions can be integrated at all levels as long as the necessary academic support is available or can be organised separately. Anyway, funding of research should be clearly separated from the funding of the rehabilitation process.

The critical condition to use a stratified rehabilitation model in the post-acute phase, is the availability of (an) assessment tool(s) to support patient referral (patient classification system). Clear criteria to distinguish the different types of organisations are essential. The advantages of this model are that a differentiation of rehabilitation supply is possible. Patients with complex needs and goals, will receive tailored specialised care which would be an excess utilisation of services for patients with simple needs and goals.

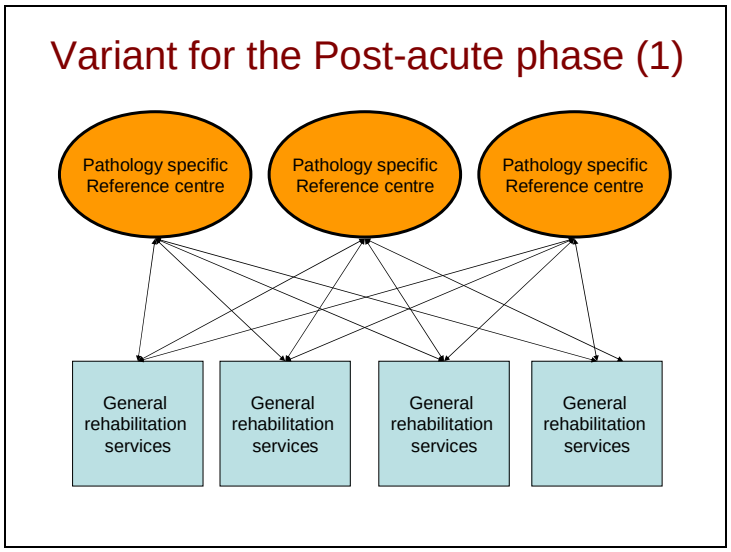
9.2.1.2 Variants of the post-acute stratified rehabilitation model

A first variant of the previously described model focuses on target populations or pathology groups (Figure 9.4). In this model a distinction can be made between:

- General rehabilitation services for simple rehabilitation needs and goals
- Reference rehabilitation services for complex rehabilitation needs and goals as a consequence of one specific health condition .

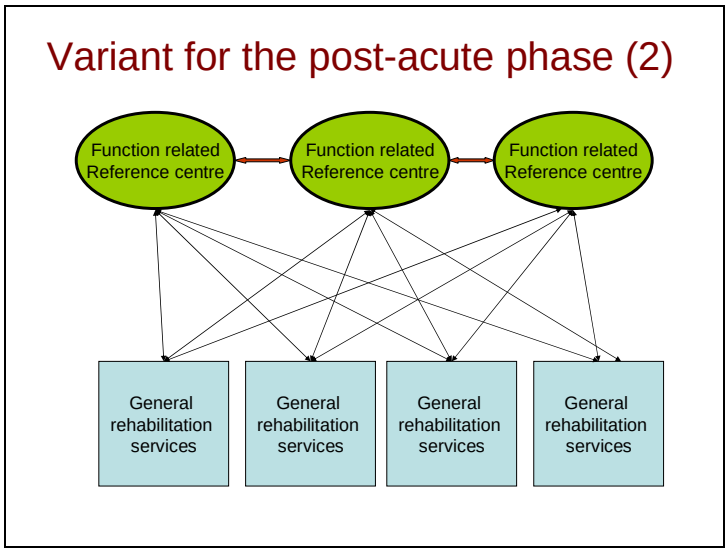
Elements of this variant can be found in some countries (e.g. the USA), where separate rehabilitation facilities are created exclusively for Spinal Cord Injuries. However, none of the countries studied, organise their services model exclusively on target groups. Probably because this would require an exponential growth in resources (facilities, infrastructure, equipment, human resources) allocated to rehabilitation. In our basic model these groups would be treated in highly specific centres.

Figure 9.4: pathology specific variant 1



A second alternative conceptual model differentiates reference centres based on "functional" impairment (motor, cognitive,…) rather than a specific health condition (Figure 9.5). This model fits into the logic of e.g. centres for "vocational" or "cognitive" rehabilitation. This model of post-acute rehabilitation was not found in any of the countries studied, although one could argue that Sweden is paying a lot of attention to vocational reintegration.

Figure 9.5: Function specific variant

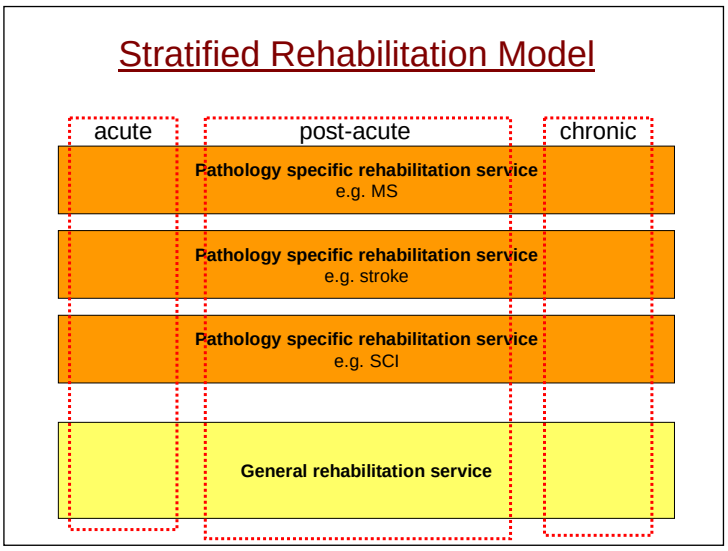


9.2.1.3 Pathology specific trajectory based rehabilitation model

Another variant of a health services model would be a pathology based approach for all phases of the disease trajectory (Figure 9.6). The referral to different strata of services is based on the assessment of (rehabilitation) needs and goals. This model is implemented in Belgium for patients with Multiple Sclerosis. In the U.S., the U.K., and in one Belgian and Swiss centre this is the organisation model for spinal cord injuries. Trauma centres in Germany can be compared to this model as well as the Dutch stroke networks.

As is the case in the basic variant, both mono- and multidisciplinary approaches can be organised, and services can be offered in inpatient or ambulatory settings.

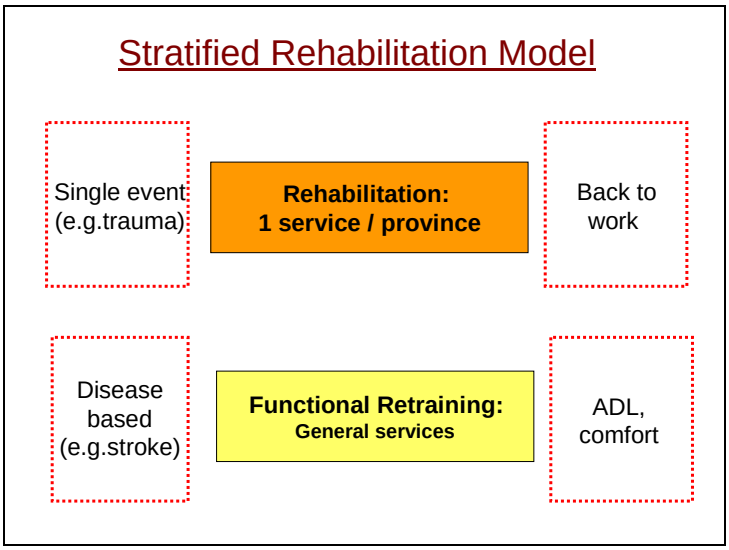
Figure 9.6: Pathology specific trajectory based



9.2.1.4 Stratified rehabilitation model: Goal oriented

Another option is to consider several organizational levels according to the final goal of the rehabilitation: back to work or not (Figure 9.7). It actually refers to one of the principles used in Belgium in the federal "Rijksfonds voor Sociale Reclassering van de Mindervaliden" or former "Fonds Maron". (see chapter 5) Within the Fund a main distinction was made whether the person to take in charge would be able after the treatment to restart work or not.

Figure 9.7: Goal oriented model 1



Some elements of this model can be found in the German geriatric rehabilitation model, and –also for the older age groups, in the somatic nursing homes in the Netherlands.

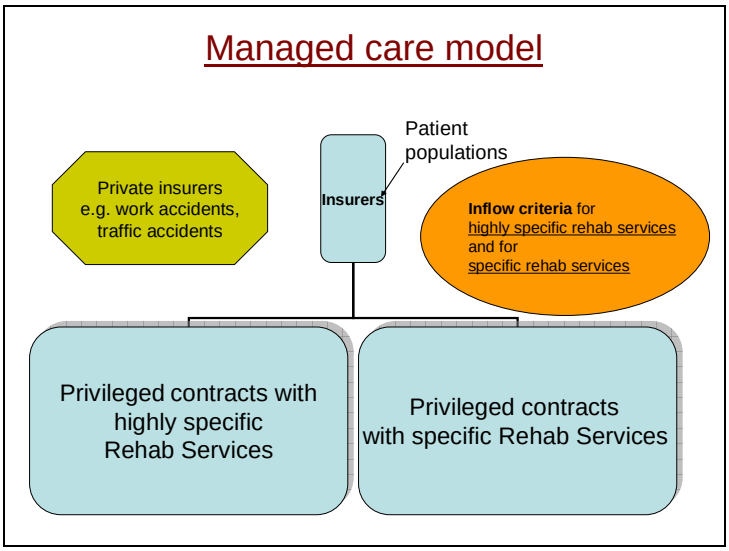
However, one can certainly not say that countries are exclusively orienting their post-acute rehabilitation on goal oriented models.

9.2.1.5 Managed Care Rehabilitation Model

In a managed care model (Figure 9.8) as currently applied in the U.S., a patient's health care services utilization is managed by the insurance company. Insurance authorization is needed for some services. The highest level of coverage is only guaranteed for services from providers affiliated with their managed care plan. Some ideas of this model can be found in the German and the Dutch models. Germans are members of sickness funds buying in services and the Dutch model of insurance is also based on a provider-purchaser model. In these countries this managed model is much more embedded in a welfare state logic than in the U.S. (See chapter 8).

The principle of contracting health care providers is not applied yet in Belgium and would require a fundamental shift in the health services approach. However, the principles of managed care could also be implemented in Belgium for example by insurers of working accidents or traffic accidents.

Figure 9.8: Managed care model for rehabilitation



9.2.1.6 Recommended conceptual rehabilitation model

The first proposed stratified rehabilitation model in the post-acute phase is considered as the best option. It would require an optimisation of the current informal organisation model of musculoskeletal and neurological rehabilitation in Belgium.

Moreover, the principles are comparable to rehabilitation models in the Netherlands, Germany, France and Sweden.

The model presented in Figure 9.3 fits best. First, the existing rehabilitation organizations apply for a payment system according to one of the three levels (general, specific, highly specific). Compared to the current Belgian reality we assume that most organisations with a convention 7.71 are comparable to highly specific rehabilitation services.

The current situation is far less clear for the specific level. The differentiation between organisations with a convention 9.50 and organisations only reimbursed via K-nomenclature is very confuse, due to the important overlap in the patient target groups as well as in the price for the item-of-service. Organisations with a 9.50 convention come closest to the concept of a specific centre, those with nomenclature to general

rehabilitation. However, some of these might be competitive as a specific or even highly specific organisation.

Clear requirements have to be set at the specific and highly specific levels on expected performances and on human resources, infrastructure and equipment. Patient target groups need to be redefined in order to avoid overlap.

The number of specific and highly specific organisations needs to be based on epidemiologic and geographical data. Follow up through systematic central registration will be necessary in order to avoid eventual under- or oversupply.

9.2.2 A Patient Classification System (PCS) to support the referral process

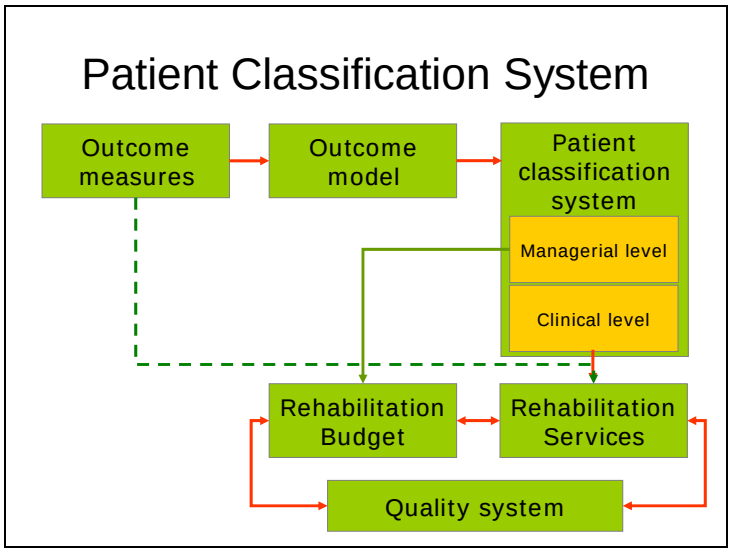
The conceptual stratified rehabilitation model should be supported by a patient classification system.

Criteria related to diagnosis, required intensity of care, rehabilitation needs and goals as well as personal and environmental factors, are needed to refer patients to a certain type of organisation in a stratified rehabilitation network (see chapter 3).

Ideally one should strive for a PCS supporting patient referral (clinical decision making) as well as resource allocation and quality assessment [100] (see chapter 3).

- One common tool for both purposes makes it easier to respect the desired interaction between the resource allocation process and the rehabilitation services;
- Only one registration is required;
- Technical and financial efforts will result in benefits on both domains.

Figure 9.9: Principles of an ideal Patient Classification System (for detailed information on this figure see chapter 3)



The comments of consulted international experts (chapter 3) illustrate both the potential value of such a PCS but also the doubts on the compatibility of both goals (clinical and managerial) when looking at the existing scales.

Some observations on existing PCS:

- ICF can serve in the mapping of the results of technical, clinical and health-status measurement tools. However, the scope of ICF is much broader than the areas relevant for clinical use, and it does not assist the clinician in selecting the most salient aspects of functioning to

assess, or the specific instruments to use in that assessment for a given individual. The ICF Core Sets are expected to offer a solution for this problem but problems are still remaining[234, 96, 235, 236, 117]. Moreover, ICF does not meet a number of basic requirements for scientific classification due to a lack of a clear definition for all the components. It is not clear yet how researchers will handle this obstacle. ICF can currently be used as a conceptual framework but the operational application of ICF is still experimental.

- Most other patient classification systems that were found only support resource allocation (see infra).

The PCS currently used for resource allocation in some countries (For example: IRF-PAI, AN-SNAP, CRAFT) were extensively discussed in chapter 3.

They typically include 3 parts:

- medical diagnosis (impairment category)
- estimation of functional disability
- registration of additional factors that typically influence the rehabilitation process like co-morbidities, age or social factors.

FIM-FRG (developed in the USA; led to IRF-PAI, AN-SNAP and to some principles in the German classification system etc.) uses FIM to estimate functional disability for inpatient post-acute rehabilitation and explains 30 % of variance of costs within the American Inpatient rehabilitation system[23, 22]. Although only covering some aspects of ICF, this is a first step in predicting and controlling resource allocation for in-hospital post-acute rehabilitation. As additional factors in this system, impairment codes, age and co-morbidities are used.

The already existing PCS for managerial purposes have some disadvantages.

Some PCS like IRF-PAI are only applicable for inpatient or for outpatient rehabilitation and do not cover the whole continuum of rehabilitation care. AN-SNAP (developed in Australia based on FIM-FRG) is an exception (see chapter 3); moreover it is specifically developed for smaller countries in order to avoid that some PCS-classes contain only few patients.

PCS for hospitalised patients include the results of tools which measure level of independence concerning ADL (FIM). These results are rather an indicator for burden of general nursing care and do not indicate rehabilitation needs. Patient groups within these PCS are homogeneous for resource needs during a hospital stay (e.g. Length Of Stay (LOS)) but not for resource needs for rehabilitation. During the development of FIM-FRG (and subsequently IRF-PAI and AN-SNAP), these "mistakes" were made voluntarily, because no other measurement tool except FIM had been sufficiently validated for almost all diagnostic categories in rehabilitation care (which is necessary for financial purposes). The option to use LOS (and not therapy intensity) as an indicator for resource allocation was taken because regarding therapy needs, practices and opinions among rehabilitation specialists are divergent (as we also demonstrated in chapter 6 and 7) and evidence in the literature is still scarce[23, 22].

The countries currently using these PCS systems are aware of the difficulties mentioned, and research is going on to develop a managerial system based on ICF. Moreover, efforts are made to make sure that this new system will fit with the financing systems already in use.

These PCS are often expensive tools and require investments in software applications and probably also in hardware. Even an existing PCS should first be validated in the Belgian context and no Belgian data are available till now.

As already outlined in chapter 4, the validation of a PCS available in other countries could go hand in hand with a validating exercise of the existing Belgian registration system MVG-RIM2, which also includes some measures of level of independence concerning ADL, for inpatient rehabilitation managerial purposes.

9.2.3 Planning of rehabilitation services

9.2.3.1 General rehabilitation (mono-disciplinary and simple multidisciplinary): bottom-up

To ensure accessibility at this level, no restrictions should be set on the number of organisations. General rehabilitation services should be provided geographically widespread (bottom-up approach). It could be considered to allow these organisations to admit patients with complex needs in the chronic phase, as these people do not always have easy access to adapted temporary intensive rehabilitation (e.g. in nursing homes). These services can be delivered by the departments of Physical Medicine and Rehabilitation, present in most of the acute hospitals.

9.2.3.2 Complex multidisciplinary rehabilitation: top-down

Decision-makers should define the number of organisations needed based on epidemiological data and evidence about intensity, content and duration of rehabilitation therapy. As this information is not yet available in Belgium, it is currently not possible to plan in such a way. An epidemiological monitoring of musculoskeletal and neurological disorders and a follow up of the developments in rehabilitation sciences is necessary. For this last purpose, an international research collaboration is recommended.

Planning of rehabilitation services requires a central database in which data of delivered services and activities as well as patients' profiles are registered, in order to dispose of relevant information concerning musculoskeletal and neurological rehabilitation in Belgium.

Besides musculoskeletal and neurological rehabilitation, other types of rehabilitation (e.g. cardiac and pulmonary rehabilitation) should be considered while planning rehabilitation services in order to increase efficiency. These types of rehabilitation might be offered in a comparable administrative framework with similar infrastructure and equipment.

9.2.3.3 Estimation of the number of needed rehabilitation services for the five selected pathologies

As mentioned earlier, in Belgium there is no central registration of rehabilitation activities or patient profiles.

In order to estimate the need for rehabilitation services an attempt is made to define the number of patients needed to be treated within these facilities, at least for the five selected pathologies in this study.

These data need to be interpreted with very great caution as they are based on incidence and prevalence figures obtained by extrapolation of other countries (Chapter 2), completed by Belgian expert opinion and some RIZIV/INAMI data.

There are some specific aspects in the Belgian context making that a model of services supply cannot be merely copied in Belgium. Here is referred to Belgium as a federal state with different regions and communities. Distances are small but the population density is very high as compared to other European countries.

The aim of this estimation is merely to give an idea on how to start, and the services supply should be corrected where necessary in the future, based on exact data once they are available.

This estimation is based on the incidence/prevalence as developed in Chapter 10, Figure 10.5.

The report of the Ministerial subgroup for locomotor and neurological rehabilitation[131] is also taken into account as this is the result of a reflection process and dialogue between different Belgian stakeholders, during more than a year of discussion and dialogue.

TOTAL HIP REPLACEMENT

The assumption is that 85% of the patients with THR have only temporary and simple rehabilitation needs, wich can usually be covered by monodisciplinary treatment. About 15 % of the patients are considered as fragile (mostly after traumatic hip fracture) or present with polypathology (e.g. rheumatoid arthritis, stroke or polyneuropathy). These patients may need a simple multidisciplinary approach.

The required rehabilitation activities in patients with THR can be provided by general rehabilitation services, present in most of the acute hospitals. The overall incidence of patients with THR in Belgium was 16.599 in 2004[46]. In the Study of prof. Closon of the Sp facilities they account for 26% of the hospital stays[24].

LOWER EXTREMITY AMPUTATION

The incidence of LEA is difficult to estimate in Belgium as in literature it is not always specified which amputation levels are included. In the Sp-study by prof. Closon LEA accounts for only 3 % of the hospital stays[24]. The majority of LEA is due to vascular disease (82%), mostly in diabetic patients. A minority are traumatic (9%) or oncological (9%)[237]. In other studies the percentages of vascular causes are often even higher. About half of the patients with LEA are fitted with a prosthesis[66]. Patients who are not fitted with a prosthesis can usually be treated in general rehabilitation services (except e.g. for bilateral above knee amputation).

Based on literature, expert opinion and RIZIV/INAMI data the assumption is that in Belgium there are about 600 new prosthesis patients each year. Of these prostheses, the proportion above knee/below knee is approximately 50/50%.

The majority of the LEA needing a prosthesis can be treated in specific services. In order to admit 30 new LEA patients per centre per year maximum 20 specific centres are needed.

The patients with above knee amputation, associated problems (traumatic or oncological etiology) and younger age, with broader rehabilitation goals, can even need highly specific services. Technology has become very specialised and the indication for expensive knee mechanisms such as microprocessor knees should depend on the decision of a highly specialised multidisciplinary team. For the small number of patients (maximum 10 %) with highly specific needs (associated problems, high technology needs, pelvic level of amputation for traumatic or oncological reasons), 2 to 3 centres are sufficient which need to collaborate with the specific centres in the network. For reasons of efficiency the highly specific centres could combine the specific function for the own region.

SPINAL CORD INJURY

The incidence of spinal cord injury in Belgium is estimated between 1 and 3/ 100.000 / year. Nearly all present with complex rehabilitation needs. These patients need treatment in highly specific services.

This means that there are about 200 new SCI patients per year in Belgium (100-300). Considering, as is defined in the report of "the Ministerial subgroup for locomotor and neurological rehabilitation", that a total critical mass of minimum 30 patients/day and 30 new patients per year is needed this brings us to a total of three or four centres for Belgium. This still means 1 centre for 2.500.000 inhabitants whereas abroad there usually is one centre for 4 to 6.000.000 inhabitants (e.g. UK and France 12 centres, Denmark 2 centres).

These highly specific centres need to work in collaboration with a network of specific centres, for instance if the distance to the highly specific centre would be to important for ambulatory treatment.

STROKE

In Belgium there are about 19 000 new stroke patients per year (incidence 185/100 000/year). Half of these occur after the age of 75 and only 25 % before the age of 65. According to the gold fist rule of Fortune and Wenn[238] approximately 1/3 dies, 1/3 recovers and 1/3 presents with permanent disability (n= 6300). Of these about half is younger then 75, and even less are younger then 70. A considerable number of the elderly patients can be treated in general services or in geriatric services.

About 15 % of stroke patients need rehabilitations services in order to obtain the predefined rehabilitation goals (n= 2860). As the incidence of this pathology is quite high, these services can be provided by specific services in function of the complexity of the rehabilitation needs and goals. In chapter 10 is described how protocols for standard patients within the different pathology groups were developed. The mean length of stay was estimated at 16 weeks. A specific subgroup needs highly specific services: the (mostly hemorrhagic) younger patients whose clinical profile is rather comparable with that of TBI patients than with ischemic stroke patients.

In the Sp-study of Prof. Closon[24] stroke patients account for 28 % of the inpatients. In chapter 5, 16 % of K nomenclature cases is coded 101A (cerebral lesions with neurological deficit) and 64 % of the cases of the 9.50 conventions concerns the group A2 (Acquired para- or tetraplegia or Brain injury that causes severe neuromotor impairments or speech- and language impairments or other severe neuropsychological impairments).

The report of "the Ministerial working group for locomotor and neurological rehabilitation"[131] states that 'locoregional rehabilitation centres', where stroke patients ought to be treated in the model they propose, minimum 60 new patients should be admitted yearly and 30 patients should be treated daily. The assumption is that a very important part of these patients will be stroke patients.

Based on all these data the estimated number of specific facilities for stroke is between 25 and 30. However, these data are based on minimum numbers of patients. Of course a larger critical mass creates opportunities for a better cost/benefit relation and increased efficiency. For the estimation of the needed number of highly specific services for stroke patients, data on the incidence of other acquired brain injuries such as traumatic brain injury (TBI) are needed, as the patients in this small stroke subgroup will probably be partly comparable to this pathology group.

MULTIPLE SCLEROSIS

The crude incidence for MS in Belgium is estimated at 4/100 000/year, meaning 400 new patients per year. The prevalence is about 10 000 patients. The assumption was made that 10 % of these patients need a hospitalisation during 4 weeks and 1/6 of the patients need ambulatory rehabilitation. The first part should be organised in a highly specific service. The ambulatory treatment can additionally be provided in specific services organised in a network around the highly specific services.

It is assumed that 2 to 3 highly specific services are needed, as well as about 25 to 30 specific services. As a reference, in Denmark there are 2 centres for about 7000 MS patients.

CONCLUSION

Most of these estimations need to be interpreted with extreme caution, due to the lack of real data and the many assumptions and extrapolations that have been made.

Registration of data should be started as soon as possible by means of a patient classification system as described in chapter 3 and in a second phase the estimation can be corrected where necessary.

The planning of the different levels of services supposes the organisation of a network through which the patient can be transferred in function of the rehabilitation phase and his rehabilitation needs and goals.

Summarised, at the level of general rehabilitation planning is not necessary as it is assumed that these services can be delivered by the departments of PM&R, present in most of the acute hospitals.

At the level of specific rehabilitation, the number of needed services is between 20 and maximum 30. Of course, these specific centres can deliver service to the different pathologies. The geographical repartition should take into account the population density which varies to an important extent in Belgium. In The Netherlands there are for instance 24 centres spread over the country for a population that is 1/3 higher than in Belgium.

Due to low incidence of some pathologies, the highly specific centres should combine different pathology groups (for instance SCI, complex amputations, multiple trauma, burns and TBI). Some specialised and expensive functions, equipment and infrastructure can be shared by different patient groups, for instance a driving simulator, a treadmill with body weight support or equipment for functional electrostimulation. The estimated number for Belgium is between 3 and 5 centres.

9.2.4 Evidence based practice: need for research

Another important issue is the principle of good clinical practice in terms of intensity, content and duration of a rehabilitation programme. Unfortunately, up to date only little evidence is available concerning these factors. Rehabilitation interventions must be evidence based and have a proven added value to achieve the defined goals.

The variability in clinical practice and clinical pathways (see Chapters 6 and 7), is related to a lack of scientific evidence to support clinical decisions in rehabilitation. This is the main weakness of rehabilitation.

For this reason a research program, preferably in an international collaboration, is needed in rehabilitation lining up with studies on the effectiveness and quality of rehabilitation activities. Similar programmes are being launched in The Netherlands, Germany and North-European countries.

9.3 MEASURING QUALITY: A REQUIREMENT FOR POST-ACUTE REHABILITATION.

One of the important issues for the near future is developing tools to assess and support the appropriateness of payment and coverage policies. For rehabilitation, a specific agenda will be needed on the development of quality systems. It is recommended to reflect on and develop quality (and/or accreditation) systems in rehabilitation for the different phases in the disease/illness trajectory. These phases have particular characteristics and different purposes. As mentioned earlier: acute care is a rather discrete event with a clear beginning and end. Post-acute care refers to the period of care that follows an acute event. Chronic care is defined by long-term, ongoing treatment. Patients needing post-acute care may require ongoing, chronic care, because of pre-existing conditions or as a result of the severity of the acute event. The integration of the phases is relevant when developing quality systems for the rehabilitation sector as a whole. Developing quality indicators and quality measures for post-acute rehabilitation should therefore be done against the background of the rehabilitation trajectory.

At first, considerations have to be made about outcome measures, as these measures can have a place in clinical practice, in research or in policy questions. This distinction has to be kept in mind when developing a system, especially since many instruments are available. The different purposes should however be built on a common trunk. When developing a useful quality measurement system the measures ("what?") should be aligned to the purposes ("why?"). Policy issues (and needs) are not the same, even necessarily in line with, clinical or research issues. This conceptual quality framework should have primarily a policy relevance.

The lack of evidence about the effectiveness of post-acute care use is a particular problem for developing quality indicators or measures. The measurement of 'added

value' or outcome of a rehabilitation process is rather difficult because a lot of independent variables influence this outcome. Besides the identification of rehabilitation needs and goals other factors need to be taken into account to select appropriate intervention strategies:

- Patient and environment related factors, such as age, motivation, social situation or profession (contextual factors)
- Disease related factors, such as nature and course of the disease, individual variability throughout the disease course, age at disease onset, availability of disease modifying agents, disease stage.

Some fundamental work still has to be done, also because of the lack of uniform outcome measures in rehabilitation. It is currently almost impossible to assess systematically the outcomes of rehabilitation as existing instruments measure functional status in different ways. The available patient assessment instruments make it difficult to identify whether similar patients are treated across different settings.

The reflection on outcome measures within a quality approach should as much as possible line up with the current efforts being done to use and implement the ICF framework (as is the case internationally). It is recommended to choose as much as possible those instruments falling within one of the dimensions of ICF. Outcome elements not covered by the ICF framework (e.g. quality of life, satisfaction) and end points such as mortality should not be forgotten. These other dimensions have to be developed at longer time notice and international collaboration is needed on this issue.

Moreover, many of the measures identified as potentially important in understanding quality of post-acute care, are not included in existing administrative data. It lacks objective and other (e.g. quality of life, integration) measures as well as global and disease specific process measures. Existing data sets may serve a variety of purposes, but currently do not include information needed to measure post-acute care quality and outcomes. They do not contain information needed to adequately measure the quality of care within and across post-acute care settings.

Several countries are currently trying to develop and implement quality and performance measurement and try to connect it (at least the outcome measures) to the financing of the post-acute and long term rehabilitation. It is recommended to analyse these efforts and make an assessment on how performance and quality measurement could be integrated in the Belgian (post-acute) rehabilitation model. An analysis of their methods to develop quality systems for daily practice, in a context of limited scientific evidence would offer an added value.

At short notice, it will not be possible to develop a quality system able to determine whether post-acute care has successfully maximized a patient's function, allowing return to the most independent living environment, and reintegration into prior activities and lifestyle. This question should be dealt with on middle term. In a first stage, a model "light version" for a quality measurement system could be prepared, at least to compare activities, patient profiles and maybe some functional outcomes. The tool should enable a comparative analysis of post-acute facilities as a "benchmark". It will offer a basis to debate profiles and (in due time) outcomes of activities of post-acute facilities.

The "light" instrument should at least measure functional level, (some) pathology-specific elements, some additional measures for risk adjustment (social characteristics, co-morbidity, …), and some items concerning patient's perception. A longitudinal method would be ideal using an admission instrument and a follow up instrument for each patient, in order to compare base-line functioning and follow up function of each patient in different phases of the rehabilitation process (compare the Swedish registers). At short notice a cross sectional approach (e.g. an adapted MVG-RIM2) might the most feasible approach to get some basic quality indicators.

Key Points

- **Belgium needs to develop an explicit conceptual framework for the organisation of post-acute musculoskeletal and neurological rehabilitation.**
- **It is proposed to develop a stratified rehabilitation model in which the roles of rehabilitation organisations can be identified, taking into account characteristics of patients' needs, disease trajectories, rehabilitation goals and epidemiological and geographical needs.**
- **The stratified rehabilitation model rehabilitation is organised around three differentiated types of rehabilitation services, taking into account patients' rehabilitation needs and goals: general rehabilitation services, specific rehabilitation services, highly specific rehabilitation services.**
- **The conceptual stratified rehabilitation model should be supported by a patient classification system: a systematic assessment of patients' rehabilitation needs in the acute phase of the disease trajectory (PCS), within the framework of an outcome model as ICF.**
- **Two criteria are used for separating the levels in this structure: complexity of rehabilitation needs and goals, and incidence and prevalence of consequences of health conditions.**
- **An equitable geographical distribution of general rehabilitation services should be pursued (bottom-up).**
- **A maximum of 20 to 30 rehabilitation centres are estimated to be necessary at the specific level; and 3 to 5 at the highly specific level.**
- **Alternative options for the stratified rehabilitation model are given.**
- **An epidemiological monitoring of musculoskeletal and neurological disorders and a follow up of the developments in rehabilitation sciences is important. Central registration of delivered services and activities is necessary. Based on these data, the proposed estimation of centres and services can be refined in the future if necessary.**
- **Quality evaluation is an important part of every organisational/financial structure. Basic data registration is a first step to evaluate the rehabilitation process. In the Netherlands and Germany, quality and performance indicators are used, even without the use of a formal patient classification system (PCS). In the US, an accreditation system is available (CARF); according to experts a European accreditation system is under development.**

10 COSTS, REVENUES AND RIZIV/INAMI EXPENDITURES FOR POST-ACUTE MUSCULOSKELETAL AND NEUROLOGICAL REHABILITATION

10.1 INTRODUCTION

In this chapter, we explore the possibility of calculating costs and revenues of five relevant pathologies. The analysis is based on the five pathologies selected in chapter 2 and examined in chapter 6 and 7.

Because of the limited evidence-based literature available on post-acute rehabilitation, 7 experts were asked to propose a rehabilitation protocol for an average patient with one of the five selected pathologies and some sungroups. Expert opinion was also used to estimate Belgian incidence of rehabilitation needs per pathology when no other information was available.

It should be stressed that these proposed rehabilitation protocols are subjective estimates and not scientifically proven to be "ideal": e.g. the experts' estimates of the average duration or average number of sessions per week showed a large variation. However, the methodology has also been used in a recent part of the HealthBASKET study by the European Commission[239], in case no other possibilities were available to estimate costs and revenues.

Consequently, estimates of costs and revenues as presented in this chapter and in the following chapter should not be interpreted as precise estimates of costs and revenues in the actual situation, with the current rehabilitation practices, nor of the precise costs of the standard rehabilitation protocols as defined by the experts. More precise estimates would require data from more rehabilitation centres (cf infra) and better data on the multidisciplinary rehabilitation activities in the five selected pathologies. The methodology does illustrate, however, some possible weaknesses of the current reimbursement system for rehabilitation and its possible effects in terms of generating discrepancies between costs and revenues. The protocols are examples of –according to the experts- rehabilitation requirements for an 'average' patient. For these rehabilitation paths, costs and revenues under the current reimbursement system are calculated. The figures will not be indicative of the actual costs, revenues and RIZIV/INAMI expenditures to be expected in practice but give an indication of the order of magnitude of costs, revenues and expenditures *for these protocols*. From this, inferences are made about the likely effects of the current reimbursement system. Policy decision should not be based on the actual value of the estimates.

10.2 METHODS

In this chapter we calculate costs, rehabilitation centre revenues and RIZIV/INAMI expenditures for the post-acute phase of the following pathologies (already examined in previous chapters): total hip replacement (THR), amputation of a lower extremity with prosthesis (LEA), spinal cord injury (SCI), stroke and multiple sclerosis (MS), THR, LEA and SCI were further subdivided into subgroups.

For THR two subgroups were made in the post-acute phase. The assumption is that the "standard" THR patient can be helped with (monodisciplinary) treatment in the acute phase. The first subgroup in the post-acute phase comprises patients presenting with "polypathology". Polypathology refers to pathology with clear functional impairments such as stroke, polyneuropathy, Parkinson's disease or rheumatoid arthritis. The second subgroup are the "fragile" patients needing a more extensive multidisciplinary treatment than provided by the standard THR rehabilitation protocol. Mostly this group consists of trauma patients.

In the LEA group the first subgroup consists of transtibial (below knee (BK)) amputations and the second subgroup of knee disarticulations and transfemoral (above knee (AK)) amputations.

The SCI group is divided in function of the level of lesion: paraplegia or tetraplegia. For MS and stroke there are no further subgroups. For LEA subgroup AK, SCI both subgroups, stroke and MS a distinction was made between rehabilitation during hospitalization and ambulatory rehabilitation. For THR only a hospitalization phase was considered. As shown in Figure 10.1, this amounts to 13 distinct categories, of which 8 inpatient and 5 outpatient categories.

Figure 10.1: Pathologies considered in the cost, revenues and expenditures analysis

Pathology Main Groups	Pathology Subgroups	
THR	Polypathology	hospitalisation
	Fragile	hospitalisation
LEA	Above knee	hospitalisation
		ambulatory
	Below knee	hospitalisation
SCI	Paraplegia	hospitalisation
		ambulatory
	Tetraplegia	hospitalisation
		ambulatory
MS		hospitalisation
		ambulatory
Stroke		hospitalisation
		ambulatory

Because insufficient evidence on good rehabilitation practice was found in literature, a group of 7 experts was invited to estimate the most optimal rehabilitation path for each of the five pathologies and their subgroups.

Information of experts has been used in other studies when little or no other information was available. The experts are physicians specialised in rehabilitation medicine, six of them with a background of physical and rehabilitation medicine and one with a neurology background. They are professionally active in the different Belgian regions (Flanders, Wallonia and Brussels) and in university as well as non-university rehabilitation centres. The experts worked in a very constructive way but insisted unanimously on the fact that a lot of assumptions were made at different levels (duration of therapy, intensity and type of therapy, setting, …) and that the estimations based on the developed "standard" protocols might be very different from the real needs, since to their knowledge little information is available in the literature. Also, according to the stratified rehabilitation model (chapter 9), patients should be referred to different levels of rehabilitation services in function of their rehabilitation needs and goals, as defined by means of a patient classification system (Figure 9.9) (cfr. Chapter 9). The standard protocols as defined by experts consensus only took the pathology into account. However, there seemed to exist a consensus on the protocols as developed during the meeting and summarised by the researchers. The methodology was as follows.

First, the experts determined a reference rehabilitation path for an 'average' patient. This reference treatment specifies:

- the number of weeks treatment is needed

- the number of hours per week a rehabilitation specialist is involved
- the number of sessions per week of paramedical input (subdivided into individual and group (4 individuals) rehabilitation activities and into the type of discipline involved (e.g. physical therapy, occupational therapy, speech therapy, social work, sports therapy, nursing and psychology).

An example of the reference treatment path for THR with polypathology requiring multidisciplinary treatment is presented in Figure 10.2

Figure 10.2: Treatment path for an average patient with THR and polypathology

Hospitalization in a rehabilitation centre			
Number of days	25		
Number of weeks	3.6		
Medical input	**hours/week**	**total hours per stay**	
Rehabilitation specialist	0.75	2.7	
Paramedical input	**hours/session**	**number of sessions per week**	**total hours per stay**
Multidisciplinary treatment		5	20.09
Individual	1		
Group sessions (4 patients/group)	0.5		
Fractions			
Physical therapist	60%		
Occupational therapist	30%		
Speech therapist	0%		
Social worker	10%		
Sports therapist	0%		
Nurse	0%		
Psychologist	0%		

10.2.1 Calculation of costs

Allocating operating costs, depreciations and overhead costs is relatively complicated. Nine different rehabilitation centres were asked to fill in a template in order to provide data on :

- Medical and paramedical staff
- Operating expenses, depreciations and overhead
- Surface area of the rehabilitation centre (inpatient ward and rehabilitation rooms)
- Annual activities, i.e. number of sessions K20, K30, K60, M and concention 9.50

Four different rehabilitation centres returned the template: one was incomplete and could not be used for the analysis, three were used to calculate cost. The other

centres were contacted again in order to know why they did not collaborate. The following reasons were given: anonimity insufficiently guaranteed, data difficult (or almost impossible) to collect, more time (and resources) needed.

In a first step total operating costs (excluding wages) and depreciation costs of the rehabilitation centre and general overhead costs were allocated to the inpatient ward and the rehabilitation rooms using their respective surface areas. Then, total annual use of rehabilitation rooms was calculated by adding up the different number of sessions, each multiplied by their respective duration (e.g. 5000 sessions K60 generate 10000 hours). This procedure yields the total number of hours per year that the rehabilitation rooms are used. Dividing operating costs, deprecations and overhead costs allocated to rehabilitation rooms by their annual use (measured in patient hours) leads to an overhead cost[ccc] per patient hour: 12.44 Euro/hour in centre 1, 15.62 Euro/hour in centre 2 and 25.51 Euro/hour in centre 3. The variables and numbers used in this calculation are reported in Figure 10.3

Figure 10.3: Allocation of overhead costs to a patient hour of rehabilitation in three centres (Euro)

	Centre 1	Centre 2	Centre 3
Overhead cost rehabilitation centre	1 392 780	1 427 224	1 481 330
Surface area Hospitalization ward	1 806	885	1 836
Surface area rehabilitation rooms	637	847	1 160
Overhead cost allocated to Hospitalization ward	1 029 657	729 365	907 969
Overhead cost allocated to rehabilitation rooms	363 122	697 858	573 361
Activities rehabilitation rooms (total number of hours)	29 194	44 675	22 474
Overhead cost rehabilitation rooms per patient hour	12.44	15.62	25.51

Multiplying these overhead costs per hour by the number of hours of rehabilitation activity according to the protocols yields an allocated overhead cost for every patient in a specific pathology. Depending on the scenario (€ 15/hour, i.e. relatively close to the overhead costs of centre 1 and centre 2 or € 25/hour, i.e. relatively close to the overhead costs of centre 3), allocated overhead costs account for 26%-27% of total costs (scenario 1) or 36%-38% of total costs (scenario 2).

Secondly, personnel costs were calculated. Using annual wage cost (seniority of 15 years) for medical and paramedical input and accounting for the number of working hours per year, it is possible to calculate the cost of one hour of medical and paramedical (subdivided into 7 categories) input. This wage cost should also be considered as approximative; it was calculated based on the average of the 3 rehabilitation centres that returned information. It does not take the employment of students or junior doctors, who receive a lower or no wage, into account. The consequence of this approach is that personnel costs may be overestimated. One of the three centres did confirm working with students or assistants. For medical specialists, cost per hour is estimated based on the annual wage cost at a university hospital, where physicians are salaried. It should be noted that in non-university settings physicians are usually self employed. The cost of medical input *for the hospital* is therefore lower but this cost is not a good representation of the opportunity cost of one hour of medical input. The cost of medical input in a non-university centre underestimates the real opportunity cost. It can be argued that the conditions for using wages of medical specialists at university hospitals as an estimate for opportunity costs are not met, but unfortunately it is the best proxy we have. Therefore, the salary of physicians working in a university setting was considered as the best proxy for the real cost. These annual wage costs and costs per hour (assuming 1626[ddd] hours of work per year) are reported

[ccc] In the following tables, the concept 'overhead costs' includes operating costs (excluding wages), depreciation and overhead of the rehabilitation centre.

[ddd] Taking into account working hours per week, public holidays, holidays.

in Figure 10.4. Concerning the wage cost of the speech therapist it should be noted that for this exercise the cost of a therapist with an "A1" degree was used whereas there are also speech therapist with a university degree. So in the future a possible increase in this cost should be taken into account.

Figure 10.4: Annual wage costs and costs per hour of human resources inputs (Euro)

	Annual cost	Cost per hour
Medical input		
Rehabilitation specialist	120 402	74.05
Paramedical input		
Physical therapist	63.840	39,26
Occupational therapist	49.497	30,44
Speech therapist	49.497	30,44
Psychologist	63.840	39,26
Social worker	49.497	30,44
Sports therapist	63.840	39,26
Nurse	49.497	30,44

Combined with the number of weeks, hours per week and sessions per week specified by the reference rehabilitation path (protocol) total staff costs can be calculated for the selected pathologies and their subgroups.

10.2.2 Calculation of revenues and RIZIV expenditures

The theoretical revenues and RIZIV expenses of the centres providing on average rehabilitation services according to the protocols defined by the experts are estimated by applying the current reimbursement mechanisms for musculoskeletal and neurological rehabilitation in Belgium to the rehabilitation protocols of the five pathologies under consideration. Given that different pathologies can be treated within different reimbursement systems (K30/K60 nomenclature, convention 9.50 and/or convention 7.71), three scenarios were built to estimate the range of likely revenues associated with the rehabilitation protocols.

Currently, THR can only be reimbursed by means of K30/K60 nomenclature. Moreover, a royal decree for the implementation of a K45-nomenclature for large joint replacement is waiting for publication. A K45 will probably be worth €46.62 and represents a session of 90 minutes.

All other pathologies can be treated either by K30/K60 or by a 9.50 convention. With the exception of LEA below knee, all pathologies included in the 9.50 convention can in principle also be treated in a 7.71 centre. We should note that the K30/K60 system is insufficient to finance the entire treatment path as defined by the experts for LEA above knee, SCI, MS and stroke, as more sessions are needed for these pathologies than reimbursed by the K30/K60 system (limited to 60 or 120 sessions depending on the pathology).

The revenues are calculated using the full price of the K30/K60 nomenclature, convention 9.50 and convention 7.71. The full price covers the reimbursement tariff and the patient out-of-pocket payment. We used the tariffs that are applicable since January 2007. An overview of the tariffs applied to the five pathologies in the three (or less if some systems are not applicable) reimbursement systems is provided in the Appendix to chapter 10.

It should be noted that for some items in the protocol, no precise reimbursement tariff could be identified. For example, if a patient gets one individual session of 2 hours and one group session of 1 hour per day, this can only be charged to the RIZIV/INAMI as one K60 (or R60 in convention 9.50), as centres can charge only one K60 per patient

per day. No specific reimbursement exists for group sessions. Therefore, group sessions are in principle reimbursed as individual sessions. For example, a group session of 2 hours is charged at one K60 per patient in the group.

For pathologies that are treated in a convention 7.71 centre, the number of hours per session became less relevant (from the sponsor's point of view), in the sense that all hospital sessions are reimbursed through a day lump sum and ambulatory sessions between 1 and 3 h as a half day lump sum and sessions between 4 and 6 hours as a day lump sum. We did have to choose, however, between the tariffs we applied for a half day or day rehabilitation, as the lump sums differ significantly between the 7.71 convention centres. For all pathologies except MS we applied an average lump sum of all centres of €119 per day of hospital treatment, €56 per half day ambulatory treatment and €103 per day ambulatory treatment. For MS, which is particularly treated in 2 specialised centres with higher lump sums, the average lump sum of these 2 centres was used.

10.2.3 Extrapolation to the Belgian population

From the unit costs, revenues and expenditures for the protocols of the five pathologies, we estimated the total costs, revenues and RIZIV expenditures for Belgium by means of extrapolation. For the extrapolation, we needed an estimation of the number of patients needing treatment for each selected diagnosis group. This is summarised in Figure 10.5.

Figure 10.5: Incidence of multidisciplinary rehabilitation requirements in Belgium for 5 selected pathologies

Pathology		Incidence
Total Hip Replacement		16.599
THR polypathology needing multidisc rehab	Hospitalization	830 (5%)
THR fragile needing multidisc rehab	Hospitalization	1.660 (10%)
Lower Extremity Amputation		1.200
LEA below knee needing multidisc rehab	Hospitalization	300 (20%)
LEA above knee needing multidisc rehab	Hospitalization	300 (20%)
	Ambulatory	300 (20%)
Spinal cord Injury		200
SCI (para) needing multidisc rehab	Hospitalization	100 (50%)
	Ambulatory	100 (50%)
SCI (tetra) needing multidisc rehab	Hospitalization	100 (50%)
	Ambulatory	100 (50%)
MS		10.000
MS needing multidisc rehab	Hospitalization	1.000 (10%)
MS needing multidisc rehab	Ambulatory	1 500 (15%)
Stroke		19.000
Stroke patients needing multidisc rehab	Hospitalization	2.850 (15%)
	Ambulatory	2.850 (15%)

To calculate these incidences, data from chapter 2 were taken into account. When more information was needed, Belgian experts in the specific field under consideration were contacted and for LEA some RIZIV/INAMI data were used.

The incidence of THR in Belgium[46] was 16 599 in 2004. Experts in the field of THR estimated the percentage of fragile patients 10% (mostly the THR due to trauma) and the percentage of patients presenting with polypathology 5%.

Rommers[237] found an incidence of LEA in the Netherlands of 19/100.000. He also states that about half of the patients are fitted with a prosthesis[66]. Based on other literature data as described in chapter 2 and on data of the RIZIV/INAMI we estimate the incidence in Belgium somewhat lower. (RIZIV/INAMI data: number of AK amputations in 1995: 653, in 1998: 614; BK amputations in 1995: 448, in 1998: 489; number of evaluation prostheses for BK provided in 2005 and 2006: 272 and 303; number of evaluation prostheses for AK provided in 2005 and 2006: 213 and 282). Combining these data, the number of LEA for Belgium is estimated at 1200/year. About 50% of the patients are fitted with a prosthesis, almost as much for AK as for BK. This means 300 patients for subgroup 1 as well as for subgroup 2, when patients deserving a prosthesis are taken into account for post-acute multidisciplinary rehabilitation, and patients without prosthesis are assumed to follow monodisciplinary treatment.

The estimated incidence of SCI in Belgium based on literature (chapter 2) is between 1 and 3/100000. This seems to be confirmed by a newsletter of ISCoS (International Spinal Cord Society) in December 2006. A European survey was performed, using a questionnaire that was sent to experts in 21 European countries. The results showed a mean incidence of SCI of 1,75/100000. So we estimate the number of new cases in Belgium at 200/year, 100 paraplegics and 100 tetraplegics.

For MS the number of new cases in Belgium yearly is estimated at 400. The prevalence in Belgium, which in this case is relevant as it concerns a progressive disorder, is estimated at 10 000 (see chapter 2). Based on Belgian expert opinion, it is assumed that ±15% of the patients need continuous ambulatory rehabilitation, which means 1500 patients. Based on information of the FOD/SPF Volksgezondheid, Santé Publique (Technical Cell), it was estimated that each year 10% of the MS patients need hospitalization. These numvers are in line with the Flemish study published in 1998 by Carton et al[240].

Concerning stroke we estimate the number of new patients at 19 000/year (see chapter 2). According to the gold fist rule of Fortune and Wenn[238], approximately 1/3 dies, 1/3 recovers and 1/3 presents with permanent disability. Of these patients only half is younger than 75 years and even less are younger than 70 years. Part of these patients goes directly to a nursing home and part of them can be treated in a geriatric ward. So it is assumed that only about 15% of all stroke patients need post-acute rehabilitation services, which brings us to 2860 patients yearly. This assumption was confirmed by the real data of a Belgian expert centre (Stroke Unit discharge).

Especially for ambulatory rehabilitation, the percentages of patients needing multidisciplinary rehabilitation are highly uncertain. To account for this uncertainty, a beta distribution was applied to each of these percentages. This is the accepted distribution for uncertain proportions. The upper and lower limits are essentially arbitrary, as there are no data in literature or from centres that can provide a clue to the ranges. The lower limit was therefore arbitrarily set at a rehabilitation need of 50% of the point estimate and the upper limit at 130% of the point estimate. The point estimate itself was defined as the mean of the beta distribution.

During the Monte Carlo simulation of the costs, revenues and expenditures for Belgium as a whole, values are chosen at random from these distributions. This eventually leads to total cost, revenue and expenditure estimates with a probabilistic distribution. 95% confidence intervals were constructed around the point estimates based on the Monte Carlo simulations. The analyses were performed in @risk version 4.5.5.

Because these five pathologies obviously do not cover the entire population in need of multidisciplinary rehabilitation, it was assumed in the extrapolation that these five pathologies cover about 75% of the total hospitalization costs and 60% of the total ambulatory care costs for multidisciplinary rehabilitation. This is consistent with the figures in chapter 2 for hospital rehabilitation and with the reported case-mix of two non-university rehabilitation centres in Belgium. To account for the uncertainty associated with this 60%, a beta distribution was applied to this variable, with an arbitrary lower limit of 30% and an arbitrary upper limit of 78%. The mean of the distribution was set at 60%.

10.3 RESULTS

10.3.1 Costs

Figure 10.6 summarises for each pathology group the number of rehabilitation days (in case of hospitalization), of rehabilitation sessions (in case of ambulatory rehabilitation) and the number of weeks treatment is needed according to the experts' protocol. Using theoretical hourly wage cost of medical input and of the various paramedical inputs combined with total number of hours medical and paramedical input (accounting for the different wage levels and their respective fractions of participation to a session), theoretical cost of medical staff, costs of paramedical staff and total staff costs were calculated. These numbers represent the actual personnel costs that would be incurred by a rehabilitation centre following the rehabilitation path as proposed by the expert meeting. It should be stressed that these calculated staff costs only include the cost for rehabilitation activities specified by the protocols. For hospitalised patients, hotel services, nursing activities etc. are not included in these protocols and hence not included in the total costs reported in the following tables.

The total costs of rehabilitation activities for the various pathologies (i.e. the cost to treat one patient according to the specified path), including personnel and overhead costs, are presented in Figure 10.7.

Figure 10.6: Staff costs of rehabilitation protocols of five selected pathologies (Euro)

	According to expert protocol		Calculated staff costs		
	Days (hosp) or sessions (amb)	Weeks	Cost medical staff	Cost paramedical staff	Total staff costs
THR polypathology	25	3.57	198	718	916
THR fragile	7	1.00	56	201	257
LEA BK	28	4.00	444	1 630	2 075
LEA AK, Hospitalization	70	10.00	1 111	5 095	6 206
LEA AK, ambulatory	20	10.00	370	1 853	2 223
SCI (paraplegia), Hospitalization	175	25.00	3 702	16 166	19 868
SCI (paraplegia), ambulatory	60	20.00	740	2 713	3 454
SCI (tetraplegia), Hospitalization	273	39.00	5 776	24 911	30 687
SCI (tetraplegia), ambulatory	78	26.00	1 203	3 484	4 687
MS, Hospitalization	28	4.00	592	2 555	3 147
MS ambulatory	104	52.00	1 925	4 646	6 571
Stroke, Hospitalization	112	16.00	2 370	7 075	9 445
Stroke, ambulatory	120	60.00	2 221	5 360	7 581

In addition sensitivity analyses with a different number of sessions (deviations of +25% and -25% of the reference path proposed by the expert meeting) and different wage levels (+10% and -10% of the reference wage level) were performed. Details on these sensitivity analyses are reported in the Appendix to chapter 10.

Figure 10.7: Costs to the rehabilitation centre of the different rehabilitation protocols for 5 selected pathologies (Euro)

	According to expert protocol		Calculated staff costs			Allocated overhead costs according to duration of rehabilitation activity (2 scenarios: € 15/hour and € 25/hour)			Calculated total costs (staff + overhead)	
	Days (hosp) or sessions (amb)	Weeks	Cost medical staff	Cost paramedical staff	Total staff costs	Hours rehabilitation activities	Allocated overhead (€ 15/hour)	Allocated overhead (€ 25/hour)	Total cost (if overhead is € 15/hour)	Total cost (if overhead is € 25/hour
THR polypathology	25	3.57	198	718	916	23	342	569	1 258	1 485
THR fragile	7	1.00	56	201	257	6	96	159	352	416
LEA BK	28	4.00	444	1 630	2 075	50	750	1 250	2 825	3 325
LEA AK, Hospitalization	70	10.00	1 111	5 095	6 206	153	2 288	3 813	8 494	10 019
LEA AK, ambulatory	20	10.00	370	1 853	2 223	55	825	1 375	3 048	3.598
SCI (paraplegia), Hosp.	175	25.00	3 702	16 166	19 868	497	7 453	12 422	27 321	32 290
SCI (paraplegia), amb	60	20.00	740	2 713	3 454	85	1 275	2 125	4 729	5 579
SCI (tetraplegia), Hosp	273	39.00	5 776	24 911	30 687	775	11 627	19 378	42 313	50 065
SCI (tetraplegia), amb	78	26.00	1 203	3 484	4 687	114	1 706	2 844	6 394	7 531
MS, Hospitalization	28	4.00	592	2 555	3 147	80	1 193	1 988	4 340	5 135
MS ambulatory	104	52.00	1 925	4 646	6 571	156	2 340	3 900	8 911	10 471
Stroke, Hospitalization	112	16.00	2 370	7 075	9 445	230	3 450	5 750	12 895	15 195
Stroke, ambulatory	120	60.00	2 221	5 360	7 581	180	2 700	4 500	10 281	12 081

10.3.2 Revenues and RIZIV expenses for the rehabilitation protocols under current reimbursement rules

The results of the calculations of the centre revenues and RIZIV/INAMI expenses corresponding to each rehabilitation protocol are presented in Figure 10.8: . The table shows the revenues per treatment protocol and the RIZIV/INAMI expenditures according to the current reimbursement mechanisms. As most rehabilitation programmes can be financed through different mechanisms three scenarios are presented,

In addition, the theoretical future revenues for THR under the not yet implemented K30/K45/K60 system were calculated (results not in table but described in text). The royal decree for the implementation of the K45-nomenclature is waiting for publication. A K45 is worth €46.62 and represents a session of 90 minutes. (Note that, according to the described protocols, only 15% of all THR deserve multidisciplinary rehabilitation (THR combined with polypathology or in fragile patients)).

For comparative purposes, the total costs borne by the rehabilitation centres for each rehabilitation protocol, assuming an overhead cost of €15/hour, are presented in Figure 10.8: . This comparison shows that for all rehabilitation paths in all reimbursement systems, except for ambulatory rehabilitation for MS, the theoretical costs are higher than the revenues. For the ambulatory rehabilitation protocol for MS, revenues under convention 7.71 are higher than theoretical costs.

Under the future K30/K45/K60 system, the revenues for the treatment of THR polypathology becomes €839.16 and for the treatment of THR fragile €233.10.

Figure 10.8: Revenues and RIZIV expenses of standard rehabilitation protocols for five selected pathologies under current reimbursement rules (Euro)

Pathology	Setting	Centre revenues per treatment protocol (total treatment period) according to current reimbursement mechanisms			RIZIV expenses per treatment protocol (total treatment period) according to current reimbursement mechanisms			Total costs borne by centres applying the protocol
		K30/K60	Convention 9.50	Convention 7.71	K30/K60	Convention 9.50	Convention 7.71	
THR								
THR polypathology	Hospitalization	1 119			1 007			1 258
THR Fragile	Hospitalization	311			280			352
LEA								
LEA BK	Hospitalization	1 368	1 368		1 231	1 231		2 825
LEA AK	Hospitalization	3 419	3 419	6 545	3 077	3 077	6 545	8 494
	Ambulatory	311	885	1 120	280	832	1 090	3 048
SCI								
SCI (para)	Hospitalization	7 459	8 159	16 303	6 714	7 414	16 303	27 321
	Ambulatory	0	2 469	3 360	0	2 378	3 269	4 729
SCI (tetra)	Hospitalization	7 459	11 327	25 466	6 714	10 582	25 466	42 313
	Ambulatory	168	3 377	4 368	168	3 259	4 250	6 394
MS								
MS	Hospitalization	1 368	1 368	3 663	1 231	1 231	3 663	4 340
MS	Ambulatory	3 264	6 682	11 440	2 960	6 038	11 283	8 911
Stroke								
Stroke	Hospitalization	5 470	5 470	10 472	4 924	4 924	10 472	12 895
	Ambulatory	2 492	6 113	6 720	2 293	5 781	6 539	10 281

10.3.3 Extrapolation of costs, revenues and expenditures to the entire rehabilitation population in Belgium

Figure 10.9 presents the results of the extrapolation of the theoretical costs, revenues and expenditures per treatment protocol to the entire patient population in need of multidisciplinary rehabilitation services in Belgium. The five pathologies were assumed to account for 75% of hospital post-acute rehabilitation and 60% of ambulatory rehabilitation (see 10.3.3).

For revenues and expenditures again three scenarios are presented, one for each possible financing system. A scenario gives the results of a situation where all services for all pathologies are financed through one specific financing system, either K30/K60, convention 9.50 or convention 7.71. For example, the revenues and expenditures in the convention 9.50 scenario are the revenues and expenditures obtained if all treatments of all patients with the pathology are reimbursed within a convention 9.50. In reality a mix of the three systems exists but as we have no data on the proportion of treatments for each of the pathologies reimbursed through the different financing systems, we could not simulate the actual revenues and expenditures if everyone would follow the protocols.

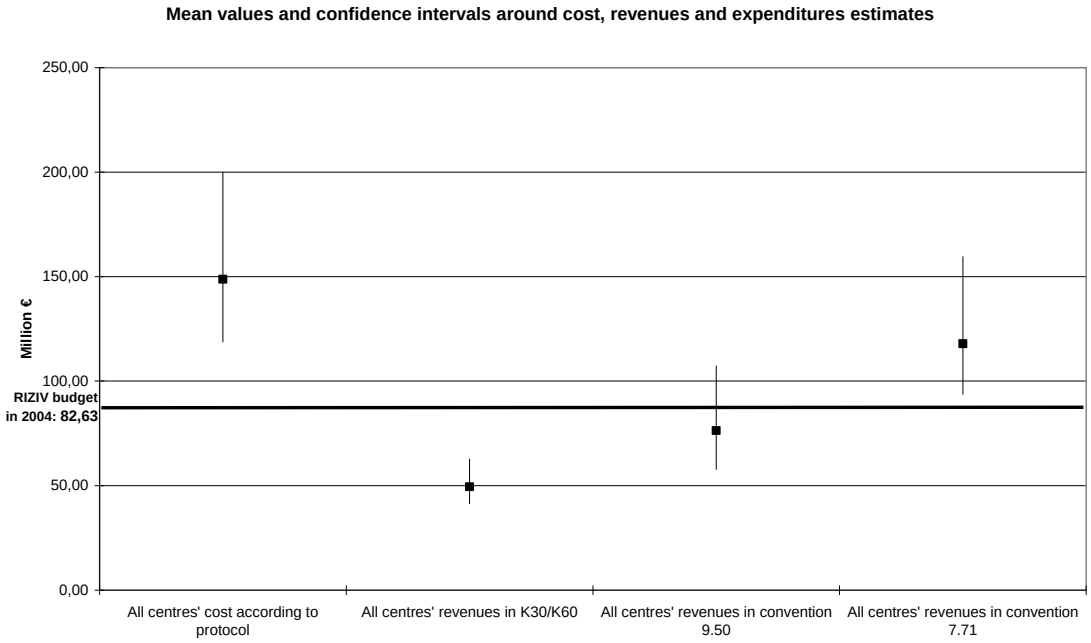
Note that the total expenditures presented for convention 9.50 and 7.71 (last row in the table) are incomplete. They do not cover the reimbursement of rehabilitation services for THR, as this pathology cannot be reimbursed through one of these conventions. Likewise, rehabilitation for LEA below knee cannot be financed through convention 7.71. For K30/K60 nomenclature, the current reimbursement rules preclude full reimbursement of some rehabilitation protocols. That is the reason why, for instance, the expenditures for SCI (paraplegia) ambulatory are zero. According to the protocols, the maximum number of treatment sessions allowed for this condition (120) is already needed during the period of hospitalization. As a consequence, there is no reimbursement left for ambulatory sessions according to the current reimbursement rules. This incompleteness for all scenarios implies that the total estimated expenditures and revenues are lower than the actual revenues and expenditures respectively associated with the rehabilitation protocols. The difference with the total centres' costs (added in the last column of the table for comparative purposes) will therefore be less pronounced in reality than in this theoretical exercise.

Figure 10.9: Total costs, revenues and expenditures for the entire rehabilitation population in Belgium (Euro)

Pathology		All centres' revenues according to current reimbursement mechanisms if protocols are followed (per year)			RIZIV expenditures per treatment protocol (per year) according to current reimbursement mechanisms			All centres' cost according to protocols (per year)
		K30/K60	Convention 9.50	Convention 7.71	K30/K60	Convention 9.50	Convention 7.71	
THR								
THR polypathology	Hospitalization	928 614	0	0	835 843	0	0	1 043 847
THR Fragile	Hospitalization	515 897	0	0	464 357	0	0	584 554
LEA								
LEA BK	Hospitalization	410 256	410 256	0	369 270	369 270	0	847 434
LEA AK	Hospitalization	1 025 640	1 025 640	1 963 500	923 175	923 175	1 963 500	2 548 053
	Ambulatory	93 240	265 635	336 000	83 925	249 525	326 940	914 422
SCI								
SCI (para)	Hospitalization	745 920	815 875	1 630 300	671 400	741 355	1 630 300	2 732 105
	Ambulatory	0	246 900	336 000	0	237 840	326 940	472 857
SCI (tetra)	Hospitalization	745 920	1 132 730	2 546 600	671 400	1 058 210	2 546 600	4 231 339
	Ambulatory	16 750	337 720	436 800	16 750	325 942	425 022	639 355
MS								

MS	Hospitalization	1 367 520	1 367 520	3 663 000	1 230 900	1 230 900	3 663 000	4 339 834
MS	Ambulatory	4 895 385	10 023 585	17 160 000	4 439 685	9 056 385	16 924 440	13 365 918
Stroke								
Stroke	Hospitalization	15 589 728	15 589 728	29 845 200	14 032 260	14 032 260	29 845 200	36 750 132
	Ambulatory	7 101 117	17 421 537	19 152 000	6 534 765	16 476 477	18 635 580	29 302 206
Total (I0.75)	*Hospitalisation*	*28 439 327*	*27 122 332*	*52 864 800*	*25 598 140*	*24 473 560*	*52 864 800*	*70 769 732*
Total (I0.60)								
(95%								
confidence		20.177.487	47.158.962	62 368 000	18.458.542	43.910.282	61 064 870	74.491.264
interval)	*Ambulatory*	**(M€13.29 – M€34.49)**	**(M€31.11 – M€80.70)**	**(M€40.81 – M€106.72)**	**(M€12.06 – M€31.36)**	**(M€28.71 – M€74.81)**	**(M€40.32 – M€103.08)**	**(M€48.61 – M€127.18)**
TOTAL								
(95%								
confidence		**48.616.814**	**74.281.294**	**115 232 800**	**44.056.681**	**68.383.842**	**113 929 670**	**145.260.996**
interval)		**(M€41.73 – M€62.93)**	**(M€58.23 – M€107.82)**	**(M€93.68 – M€159.58)**	**(M€37.95 – M€58.57)**	**(M€48.29 – M€89.38)**	**(M€92.69 – M€158.07)**	**(M€118.24 – M€198.30)**

Figure 10.10: Graphical presentation of the uncertainty around the point estimates of aggregate costs, revenues and RIZIV/INAMI expenditures for musculoskeletal and neurological rehabilitation in Belgium (revenues per payment system incomplete, see 10.3.3.)



The point estimates of total costs, expenditures and revenues in Figure 10.9 (last row) show that all three reimbursement systems are insufficient to cover all theoretical costs for all rehabilitation services if the rehabilitation protocols would on average be followed. On a disease-specific level, revenues are found to be higher than costs under convention 7.71 for ambulatory rehabilitation of MS. For all other pathologies and systems, theoretical costs are systematically higher than revenues. Note that for convention 9.50 and convention 7.71 rehabilitation for some pathologies is not included in the estimates for revenues or expenditures while they are included in the estimates of costs. If these pathologies would, as in reality, be financed through another mechanism the revenues/expenditures would increase.

In the new –although not yet implemented- K30/K45/K60 system, total revenues would be €696 461 and €386 923 for THR polypathology and THR fragile respectively. The impact on the total revenues for all centres across all pathologies is about €474 000.

These point estimates do not take uncertainty in our estimates into account. The uncertainty is large, however, because we could not rely on data registrations for the estimation of the percentages of patients in need for multidisciplinary rehabilitation, especially not for ambulatory treatments.

Figure 10.10 presents the confidence intervals around the point estimates of the aggregate costs, revenues and RIZIV/INAMI expenditures for Belgium. The intervals represent the uncertainty around the point estimates associated with the assumptions about the prevalences of ambulatory rehabilitation in all five pathologies and about the percentage of ambulatory rehabilitation services covered by these 5 pathologies.

The confidence intervals are large for all values, which means that the uncertain variables in our model have an important effect on the estimates.

The most important determinant for the estimates turned out to be the estimated percentage of ambulatory care covered by the five selected pathologies. In the base case analysis, this was assumed to be 60%. The higher the percentage is, the lower the total costs, revenues and expenditures will be. The second and third most important factors are the assumed percentage of patients with MS and stroke needing ambulatory

rehabilitation. The higher these percentages are, the higher the total costs, revenues and expenditures will be.

10.3.4 Discussion

Without giving too much weight to the actual cost figures because these are based on (incomplete) data from a small number of centres, four major findings can be drawn from our analyses. Although estimates of costs and revenues should not be used for policy decision, the merit of the developed methodology is that it reveals certain weaknesses in the current reimbursement mechanisms for rehabilitation. In the following paragraphs, explanations for the main findings are sought.

10.3.4.1 Aggregate revenues versus aggregate costs

A first finding is that, for all pathologies taken together, none of the reimbursement systems (K-nomenclature or conventions) covers the total aggregate costs (last row in Figure 10.9). Possible reasons for this finding can be related to the methodology used for calculating costs and revenues (points 1 and 2 hereunder) or to the specific features of the reimbursement systems (point 3).

Methodological reasons for the difference between costs and revenues might be:

1. Costs are overestimated

The cost estimates are based on the cost structure of 3 rehabilitation centres in Belgium. This is not a representative sample of the entire rehabilitation supply in Belgium. Estimates of unit costs, both for personnel and overhead, might be exagerated relative to the costs of other centres. For example, personnel costs for one hour of therapy are based on the annual wage cost of a professional therapist and an assumed number of working hours. The personnel costs presented are hence estimates of the costs in case no students or assistants would be deployed to do part of the rehabilitation treatment as defined in the expert-opinion based protocols. If students or assistants are deployed and if the number of working hours per year is underestimated, the costs will be lower than the costs presented in this chapter. The impact of overstimation of personnel costs is important, as personnel costs are about 80% of the total estimated rehabilitation costs. This applies for all pathologies.

Overestimation of costs might also be due to the use of expert panels consisting of rehabilitation physicians to develop rehabilitation protocols. These experts may have overestimated the number of individual sessions and/or underestimated the number of group sessions in the rehabilitation protocols. If the number of individual sessions is overestimated or the number of group sessions underestimated, actual costs will be lower and come closer to the revenues.

2. Revenues are underestimated

The amount of money paid for therapeutic services to patients hospitalised in a Sp-unit through the day price ("ligdagprijs") is not included in the calculations of the revenues. It was impossible to include this in the estimates because no information is available on the percentage of this amount that can be attributed to the five pathologies under consideration in case the protocols would be followed. The impact of this exclusion is that the revenues in all financing systems are underestimated. It is unlikely, however, that this has a major impact on the estimates, as these amounts are spread over all patients receiving multidisciplinary rehabilitation in hospital.

Another possible reason for underestimation of revenues, in particular in the K30/K60 system, is omission of the revenues generated by the first "diagnostic" evaluation. This activity can be charged in the K30/K60-system. The bias generated by this omission is likely to be small, as the costs of this act were also not included in the cost estimates for the rehabilitation centre and revenues generated by the act are small compared to the total revenues generated by the rehabilitation path. The omission of this cost item will hence have a downward effect on both cost and revenue estimates.

If 1 and 2 do not explain the difference between aggregate costs and revenues, -which is unlikely given the almost certain overestimation of personnel costs- the explanation of the finding might be related to the reimbursement system:

3. The current reimbursement rules might insufficiently reflect the actual cost and cost structure of rehabilitation services. This would imply that -if the protocols that describe rehabilitation needs for five pathologies would on average be followed by all treatment centres in Belgium- the rehabilitation sector as a whole would work with deficits.

In practice, centres will try to avoid deficits. Different mechanisms exist to reduce the difference between costs and revenues on the level of rehabilitation centres. First, potential deficits can be reduced by changing the case-mix of patients treated. Our assumptions on case-mix were based on estimates of experts on the percentages of patients in each pathology group needing multidisciplinary rehabilitation. Obviously, the difference between costs and revenues is larger for some pathologies than for others. This may induce an incentive towards treating more patients for which revenues are relatively closer to costs.

Second, patients can be treated less intensively than described in the expert opinion-based rehabilitation protocols. The provision of rehabilitation services can be driven by the financing system. For instance, according to the rehabilitation protocols a SCI (tetra) patient needs 3 hours of individual rehabilitation treatment and one hour of group treatment per day during hospitalisation. In the K-nomenclature, however, only one K60 (corresponding to 2 hours of therapy) can be charged per day. Consequently, an incentive for providing only 2 hours of therapy is created by this reimbursement system, whereas 3 hours are needed according to the experts.

10.3.4.2 Revenues versus unit costs of ambulatory MS rehabilitation

A second finding of our study is that for each of the ideal rehabilitation protocols revenues are lower than theoretical costs, except for ambulatory rehabilitation of MS under convention 7.71. The reason for this different result for ambulatory MS rehabilitation is related to the inherent nature of the reimbursement system under convention 7.71. For "MS ambulatory" the protocol defines a rehabilitation need of 1 hour individual treatment and 1 hour group treatment two times a week during 52 weeks. In convention 7.71 every session between 1 and 3 hours is charged at the same lump sum, meaning that 3 hours of treatment generate the same revenues as 1 hour of treatment. The costs as defined by the protocol borne by the rehabilitation centre relates to 1.25 hours of treatment only (1 hour group session with 4 patients implies that 0.25 hours are allocated to each patient in the group), while the reimbursement is the equivalent of a reimbursement for 3 hours of treatment.

For the other pathologies, revenues were not higher than costs under convention 7.71. This is due to the fact that the lump sum per day for the 2 MS 7.71 centres (centre 1 an 2 in chapter 5) is higher than the lump sum in other 7.71 centres that also treat other pathologies.

10.3.4.3 Revenues for ambulatory versus hospital rehabilitation

A third finding of our study is that the aggregate revenues for ambulatory care significantly exceed the aggregate revenues for post-acute rehabilitation in hospital if the rehabilitation protocols are on average followed. This is the case at least for convention 9.50 and convention 7.71, not for the K-nomenclature (note that revenues under K-nomenclature are incomplete for several pathologies in the protocol). However, there is no significant difference between the *costs* of hospital rehabilitation and ambulatory rehabilitation if we take uncertainty about the percentage of ambulatory care covered by the 5 pathologies (60%) into account.

If we focus on the absence of a significant difference between hospital and ambulatory rehabilitation costs and the presence of a significant difference for hospital and ambulatory rehabilitation revenues/expenditures, we can draw a number of conclusions related to the financing systems for rehabilitation in general. The discrepancy can again be attributed to the inherent financing rules under conventions 9.50 and 7.71. In convention 9.50 1 hour individual therapy and 1 hour of group therapy per session is

"charged" in the current simulations at a rate for R60, which is actually the reimbursement of 2 hours of therapy. The costs, however, are calculated on the basis of 1.25 hours of therapy. Similarly, in convention 7.71 every session between 1 and 3 hours is charged at the same lump sum, meaning that 3 hours of treatment generate the same revenues as 1 hour of treatment (cf supra). As the ambulatory rehabilitation paths for stroke and MS are relatively long compared to the rehabilitation path in hospitalisation and as both pathologies are important determinants of the total revenues estimates, this weakness of the current financing system weighs relatively more heavy for ambulatory care than for hospital care. This implies that a difference is found between revenues for hospital and ambulatory rehabilitation that is not found between costs of hospital and ambulatory rehabilitation. It can be concluded that the relatively large difference between revenues of ambulatory rehabilitation and hospital rehabilitation is hence artificial and caused by the rules of the financing system. A reimbursement system that better ressembles the cost structure of rehabilitation services is necessary. This could imply, for instance, the implementation of a specific reimbursement rule for group sessions.

The absence of a significant difference between hospital and ambulatory rehabilitation in the K-nomenclature is due to the limitation of reimbursement to 60 or 120 sessions depending on the pathology. Hence, the protocols are only partially covered by the reimbursement system based on the K-nomenclature.

10.3.4.4 Budget actually spent to rehabilitation versus estimated budgets

Finally, the budget spent to musculoskeletal and neurological rehabilitation in 2004 is highly similar to our estimates of aggregate expenditures if all rehabilitation protocols would be followed and if convention 9.50 would apply for all pathologies[eee]. This does not apply to the situation where all rehabilitation activities would be financed through the K-nomenclature. The latter finding is related to the limitations imposed on the number of reimbursable sessions in the K-nomenclature. The protocols, as defined by the experts, are incompletely reimbursed under the K-nomenclature. Some sessions, although considered necessary, are not reimbursed. Convention 9.50, on the other hand, allows reimbursement of complete rehabilitation protocols, be it at a reduced tariff if certain limits are exceeded. The fact that the budget spent in 2004 ressembles the estimated expenditures in convention 9.50 if the protocols are followed, may mean that the optimal rehabilitation paths are currently on average followed, although there might also be discrepancies between pathologies that level each other out. On the other hand, one might argue that the experts defined their current practice as the 'optimal' practice. The method of using expert opinion has the inherent weakness that it might induce a bias.

We tried to test the hypothesis that protocols are biased by comparing part of the actual staff (rehabilitation specialists and physical therapists) dedicated to treat stroke patients in two rehabilitation centres with the need (according to the protocols) for rehabilitation specialists and physical therapists to treat their reported number of stroke patients. Actually available staff varied from approximately 50% of the needed staff (according to the protocols) to 75% of the needed staff.

A number of simulations were performed to investigate the budgetary impact of a number of scenarios.

In Figure 10.11 protocol staff costs for treating one patient (stroke hosp or stroke amb) and costs for the Belgian population were calculated, assuming that total duration and the number of sessions were a fraction (50%, 60%, 70%, 80%, 90% and 100%) of the numbers specified in the protocol (the 100% column is equal to the protocol). Total costs for treating the entire population are now closer to the payments centres would receive according to current reimbursement mechanisms if protocols are followed (see the column "All centres' revenues according to current reimbursement mechanisms if

[eee] Note that the expenditures for rehabilitation after THR (necessary for only 15% of all THR patients) should be added to the total expenditures estimates for convention 9.50, as this rehabilitation will have to be reimbursed in some way or another; if not by convention 9.50, it will have to be by other financing mechanisms. This will slightly increase the aggregate expenditure estimate for convention 9.50.

protocols are followed (per year)" according to current reimbursement mechanisms (Figure 10.9).

Figure 10.11: Protocol staff costs for treating one patient (stroke hosp or stroke amb) and costs for the Belgian population per year, when duration and number of sessions in the protocol vary (Euro).

	Assumption: duration and sessions as percentage of protocol					
	50%	60%	70%	80%	90%	100%
Total staff costs stroke hosp	4 722	5 667	6 611	7 556	8 500	9 445
Total staff costs stroke amb	3 791	4 549	5 307	6 065	6 823	7 581
All centres' personnel cost according to protocol (per year, for the entire population) stroke hosp	13 458 816	16 150 579	18 842 343	21 534 106	24 225 869	26 917 632
All centres' personnel cost according to protocol (per year, for the entire population) stroke amb	10 803 603	12 964 323	15 125 044	17 285 764	19 446 485	21 607 206

Figure 10.12 presents results, assuming that the actual amount of individual sessions is smaller that specified in the protocol (Baseline). Two variants are presented: one in which half of the individual sessions (according to the protocol) are replaced by group sessions and a second alternative where all individual sessions are replaced by group sessions. Note that no "group tariff" exists, so staff costs were lowered to account for the group sessions. Both staff costs for treating one patient (stroke hosp and stroke amb) as well as cost per year for treating the entire population are presented. Again, costs for the protocols come closer to revenues if part of the individual sessions are replaced by group sessions.

Figure 10.12: Protocol staff costs for treating one patient (stroke hosp or stroke amb) and costs for the Belgian population per year, when the amount of individual sessions in the protocol is replaced by more group sessions (Euro).

	Assumption		
	Baseline	50% Ind --> group	All Ind --> group
Individual sessions stroke hosp	2	1	0
Group sessions stroke hosp	1	2	3
Individual sessions stroke amb	1	0.5	0
Group sessions stroke amb	1	1.5	2
Total staff costs stroke hosp	9 445	7 086	4 728
Total staff costs stroke amb	7 581	5 973	4 365
All centres' personnel cost according to protocol (per year, for the entire population) stroke hosp	26 917 632	20 196 147	13 474 661
All centres' personnel cost according to protocol (per year, for the entire population) stroke amb	21 607 206	17 024 374	12 441 543

In the following chapter, the financing possibilities and financial consequences of the different rehabilitation models described in chapter 9 are presented.

Key points

- **Because of the limited evidence-based literature available on post-acute rehabilitation, 7 experts were asked to propose a rehabilitation protocol for an average patient with one of five selected pathologies. Expert opinion was also used to estimate Belgian incidence of rehabilitation needs per pathology when no other information was available. Data from 3 rehabilitation centres were used to estimate costs of these rehabilitation needs. Due to the limitations of this methodology, estimates of costs and revenues as presented in this chapter should not be used for policy decisions. The merit of this methodology is that it reveals certain weaknesses in the current reimbursement mechanisms for rehabilitation.**
- **For a given rehabilitation protocol for each of the five pathologies examined, theoretical costs are higher than revenues, except for ambulatory rehabilitation for MS *in convention 7.71*. The exception for MS can be explained by the specific reimbursement conditions of the two 7.71 centres specialized in MS (higher lump sum than other 7.71 centres and no separate tariff for sessions of less than 3 hours) and the long duration of ambulatory rehabilitation in this patient group.**
- **Aggregate revenues for ambulatory rehabilitation in Belgium are higher than for hospital rehabilitation. This relationship was not found for the *costs* of ambulatory rehabilitation and hospital rehabilitation. This pointed towards an artefact in the estimates of the revenues caused by the rules of the current financing system. More specifically, the absence of a separate tariff for group sessions induces higher revenues than costs for group sessions.**
- **Aggregate revenues for rehabilitation services in each of the reimbursement systems are insufficient to cover theoretical aggregate costs. This can be explained by methodological weaknesses of the study (overestimated costs or underestimated revenues) and/or to the fact that the current reimbursement system does not reflect the cost structure of rehabilitation services. The real difference between costs and revenues will moreover depend on the actual case-mix.**
- **One illustration of this inadequate reflection of the cost structure in current reimbursement rules is the reimbursement of a maximum of 2 hours of treatment per day in the K-nomenclature and convention 9.50. For some pathologies (especially during the initial phase of rehabilitation, see the proposed protocols during hospitalization) more than 2 hours of treatment per day is needed.**
- **The limited number of sessions and the limited duration of sessions in the K-nomenclature is insufficient to cover the therapeutic needs of patients with very complex rehabilitation needs, such as spinal cord injury.**
- **The budget spent to musculoskeletal and neurological rehabilitation in 2004 highly resembles the estimates for aggregate expenditures if all rehabilitation protocols would be followed and if all activities would be reimbursed through convention 9.50. On the one hand, this may mean that the optimal rehabilitation paths are currently followed on average, although there might also be discrepancies between pathologies that level each other out. On the other hand, this may mean that the protocols are based on current practices rather than on rehabilitation needs.**

11 OPTIONS FOR FINANCING POST-ACUTE MUSCULOSKELETAL AND NEUROLOGICAL REHABILITATION IN BELGIUM

11.1 INTRODUCTION

No good arguments can be developed to maintain the current financing mechanisms in their actual form (Conventions 9.50 and 7.71, K-Nomenclature, see description of Belgian system in Chapter 5). The implicit logic of these existing financing systems has to be fine-tuned. A clear distinction between the different systems is necessary.

As in many other countries, a closed-end budget with a prospective financing system is preferable if we aim at keeping control over the rehabilitation budget (for typology of financing see Chapter 5). Internationally (see Chapter 8) a tendency exists to integrate different components of financing rehabilitation into one reimbursement package. Some countries are evaluating this option, others have already implemented such a system. The reimbursement package is allocated based on the relative weight of homogeneous groups of patients classified by means of a Patient Classification System (PCS).

For example: In the U.S. individuals in Inpatient Rehabilitation Facilities are classified in Cost Management Groups (IRF-PAI) and payments are done per discharge. Individuals in Skilled Nursing Facilities are classified in the Resource Utilisation Groups - III (MDS-PAC) and payments are done per diem.

11.2 OPTIONS FOR FINANCING MECHANISMS

Based on the literature search and expert opinion, no ideal system is implemented yet.

In an international context, most financing models try to integrate different components of financing rehabilitation into a lump sum[fff] approach as far as possible. For each type of rehabilitation organisation, budgets are being allocated to homogeneous groups of patients included in a PCS.

11.2.1 Advantages and disadvantages of different payment mechanisms.

In Chapter 5 of this report different types of financing mechanisms were classified according to a typology model for provider payment mechanisms in health care.[123] This typology model classifies payment systems according to two dimensions: fixed versus variable systems and retrospective versus prospective systems. Advantages and disadvantages as well as (perverse) incentives created by a number of payment systems were discussed. In addition this model showed that the unit of payment also has an important impact on the classification (and the associated incentives) of a financing system.

In the following sections a limited number of elementary payment mechanisms will be proposed and discussed briefly (for a more elaborate discussion we refer to the typology model presented in Chapter 5).

11.2.1.1 Fee for service

An advantage of a fee-for-service (FFS) is that the number of activities and the amount of payment are closely linked. Consequently, a FFS generates incentives for a sufficient amount of quality care (provided that marginal revenue exceeds marginal cost) and production will probably increase. However, a fee-for-service mechanism requires well-defined and measurable activities (e.g. diagnostic or therapeutic activities).

[fff] The term 'lump sum' which will frequently be used in the following sections is intended as a micro concept, i.e. it refers to a fixed payment for a given rehabilitation path (protocol) and not to a fixed (annual) budget for a rehabilitation centre (macro interpretation).

A disadvantage is that a FFS provides incentives for supplier induced demand (SID), especially combined with excess supply, and may lead to overconsumption and higher than expected costs for the sponsor, i.e. there is a substantial risk of exceeding the a priori defined budget.

In order to avoid this, specific measures are possible such as fixing the total number of activities or an a posteriori price calculation according to the number of activities so that centres exceeding their a priori target level of supplied care (or budget) get financially punished.

11.2.1.2 Lump sum

The main advantage of a lump sum payment system per protocol is that it creates incentives for cost containment. From the point of view of the sponsor it facilitates controlling total payments and for the supplier total budget for a particular treatment is clearly known. Moreover a lump sum system allows to allocate budgets for essential activities in complex rehabilitation that are difficult to register (e.g. coordinating activities and interdisciplinary discussions).

However, it does not give financial incentives to provide high quality services. On the contrary, suppliers may be induced to provide a suboptimal level of care and may try to select good risks in order to avoid financial losses. Therefore implementation of such a mechanism should go hand in hand with accountability, quality control and a reliable PCS.

11.2.1.3 Mixed payment mechanism

A mixed payment system combines a FFS with a fixed component (lump sum). The advantage of a mixed system is that it combines the characteristics of both FFS and lump sum. It contains the advantages (and disadvantages) of both into a blended system that dampens the undesired incentives of each of the extreme mechanisms. It can be constructed as a linear combination of the lump sum (i.e. fixed payment) that would be received to treat a particular patient according to the protocol and the FFS payment scheme for that patient. Suppose a particular treatment can be financed using a FFS or a fixed payment :

F : fee = cost per session (in FFS)
n : number of sessions (in FFS)
Total payment FFS : nF
Total fixed payment for treatment : FP
Payment mixed system : $MS = \alpha FP + (1-\alpha)nF$ with $0 \leq \alpha \leq 1$

The parameter ☐ can be considered as the weight (fraction) of the fixed payment in total payment : if ☐ = 0 the formula collapses into a FFS payment and if ☐ = 1 it equals the fixed payment; ☐FP is a fixed, lump sum part of the payment and (1-☐)nF is the variable part, depending on the number of sessions. Varying ☐ allows to stress either the FFS component or the fixed component and their respective advantages and incentives.

A hypothetical example of total and marginal payments of a FFS, lump sum to finance a particular protocol and two mixed systems (☐ = 0.25 and ☐ = 0.80) are depicted in Figure 11.1 and Figure 11.2. It is clear that in the mixed system institutions with relative high numbers of high cost patients are less penalised than in a lump sum mechanism. On the other hand, incentives for overconsumption are smaller compared to a FFS system.

It is clear that a high share of fixed payment is more indicated in case of relatively high fixed costs, whereas a high share of FFS payment is better indicated in case of a relatively high proportion of variable costs – in order to reduce the financial risk for the provider. However if the provider can relatively easily influence the number of activities, this 'advantage' of reduction in financial risk for the provider, must be weighed against the 'disadvantage' of potential excess utilisation of the service. This disadvantage would not show up in case of fixed funding, but the latter may have the disadvantage

that providers are not strongly encouraged to supply a sufficient amount of care to their patients.

Figure 11.1: Total payment

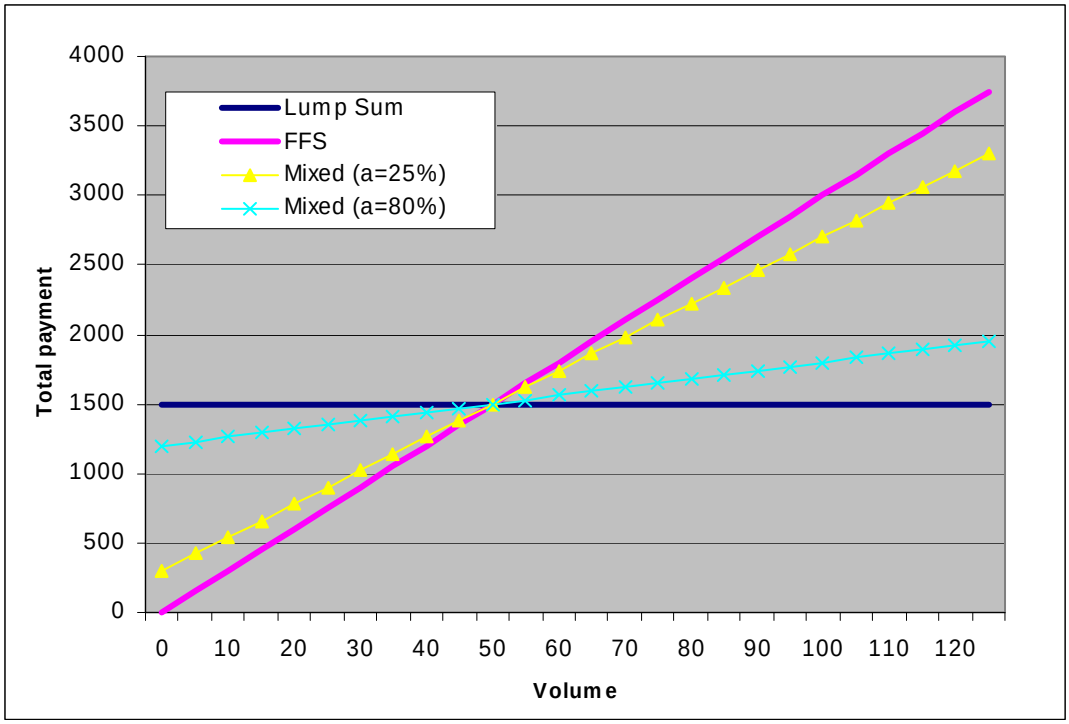
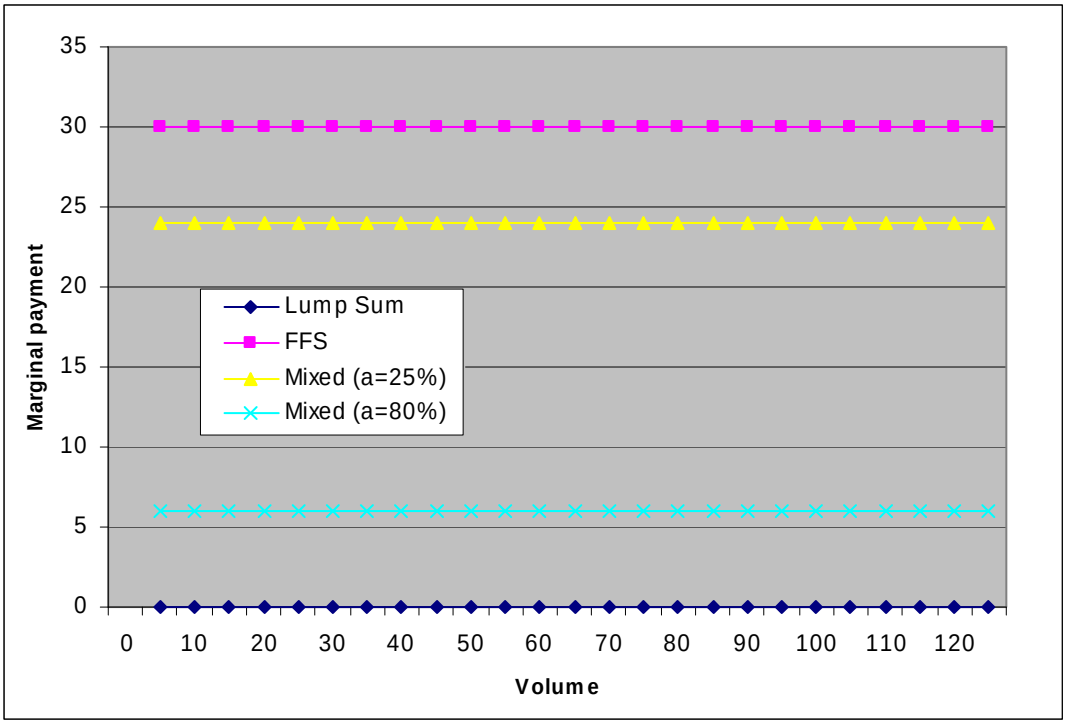


Figure 11.2: Marginal payment



11.2.1.4 Variants of units of payment

The classification of a payment as lump sum or FFS also depends on the unit of payment (e.g. a fee per discharge, per episode, per year, capitation payment… (see chapter 5))

11.2.2 Options for financing of the stratified rehabilitation model

For the stratified rehabilitation model (see 9.2.1.1) several options for reimbursement will be discussed. For each level, two budgets will be calculated: (1) the budget that would be required to cover all costs of the centres offering rehabilitation services (assuming that the treatment protocols presented in the previous chapter are on average followed) and (2) the budget that corresponds with the amount the RIZIV/INAMI could spend on the three levels if it works with a fixed budget of €82 625 881 (i.e. the budget spent in 2004)(see chapter 5) for musculoskeletal and neurological rehabilitation (i.e. budget-neutral resources)

The starting point is a stratified model with the five studied pathologies attributed as follows: hospital rehabilitation for MS and hospital and ambulatory rehabilitation for SCI in the highly specific level, ambulatory rehabilitation for MS, hospital and ambulatory rehabilitation for stroke and LEA in the specific level, THR in the general level. (The general level consists of pathologies requiring only monodisciplinary or simple multidisciplinary rehabilitation services, such as THR, recovering strokes and a number of orthopaedic cases like shoulder rehabilitation, chronic back pain,…).

For the calculation of the budget to be allocated to the different levels of the stratified organisation model under the restriction of total-budget neutrality, it is assumed that the share of the pathology in the 2004 budget is equal to the share of the pathology costs in the total costs for the entire population if the rehabilitation protocols would be followed, as calcualted in Figure 10.9.

One reimbursement option is a uniform financing system for all levels within the stratified model. However, differences in complexity (higher in the (highly) specific level) and predictability (lower in the general level due to higher variability in case-mix) of rehabilitation activities, favour differentiation in financing mechanisms, as is shown in Figure 11.4.

11.2.2.1 General rehabilitation services (simple rehabilitation needs)

Because of the lower predictability of rehabilitation activities due to an expected high case-mix variability, a lump sum payment system is less convenient for general rehabilitation services. A lump sum payment would bear high (financial) risk on providers which could lead to a policy of risk selection and attempts to redirect high cost patients to other institutions. On the other hand, it could be argued that an increase in scale (i.e. a sufficient or number of patients) reduces the variance and the risk for the rehabilitation centres. However it is anything but clear whether Belgian (general) rehabilitation centres have a sufficient scale in order to reduce the financial risk from a lump sum payment adequately.

Therefore the financing mechanism for general rehabilitation services (simple rehabilitation needs), could be fee for service, or a mixed system with relatively high weight of the FFS component. The service is a rehabilitation activity performed by one or more types of professionals in a mono- or (simple) multidisciplinary way.

If only one professional is involved (mono-disciplinary rehabilitation, strictu sensu no rehabilitation (see chapter 1) since only one discipline is involved), a therapy specific fee is provided (e.g. physical therapy, occupational therapy, psychology, speech therapy...).

If different types of professionals are involved (multidisciplinary rehabilitation) two options are possible.

- A first option is a common fee covering different disciplines (multidisciplinary fee). The payment is made to the team and team members will have to bargain on the distribution.
- A second option is a system in which every therapeutic (or medical) discipline gets a separate fee as mentioned for mono-disciplinary rehabilitation.

If all costs of the general rehabilitation services are supposed to be covered by the reimbursement system, the RIZIV/INAMI should keep about €49 million available for reimbursement of the general rehabilitation services. This is the difference between the extrapollated total costs of rehabilitation services as calculated in Figure 10.9 and the total costs associated with the 4 pathologies classified in the specific and highly specific level. In case of a budget neutral operation relative to 2004, about €28 million should be reserved for this level.

11.2.2.2 Specific and highly specific rehabilitation services (complex rehabilitation needs)

Since the number of pathologies to be treated in specific and highly specific rehabilitation services is smaller and pathologies are relatively clearly defined, a lump sum or mixed payment system (with relatively high weight of the lump sum component) might be easier to implement and less contestable than in the general rehabilitation services.

Therefore, for highly specific rehabilitation services, the proposed financing mechanism could be based on a lump sum per treatment protocol. The lump sum can be paid by means of different units-of-payment[ggg]. Alternatively, a mixed system may be chosen with a relatively higher weight for the lump sum. In this mixed system as well, the payment is done per treatment path, which boils down to a payment per capita with a fixed component (the lump sum) and a variable component.

As the number of centres providing highly specialised rehabilitation services will probably be very limited, an alternative financing system might be a fixed budget per rehabilitation centre. The amount of this so-called "envelope" can be determined by the case-mix of the centre. Again, a good PCS is indispensable to determine the case-mix.

For the specific rehabilitation services, a mixed system with a relatively lower weight for the lump sum is an option, as this level is characterised by a somewhat larger number of pathologies and less complex rehabilitation needs than the highly specific level.

[ggg] If the unit-of-payment is the activity then it becomes a fee-for-service

The first option is a lump sum covering all components of rehabilitation (e.g. diagnostic and therapeutic activities, coordination and interdisciplinary activities, infrastructure and equipment). Especially for the highly specific services this is preferable. In case of inpatient rehabilitation this lump sum may even cover components related to hospital stay (e.g. general nursing care, hotel services, infrastructure and equipment) as is the case in other countries (chapter 8).

Other options hold different financing mechanisms per component of rehabilitation services. These might be considered for the specific services.

- FFS for measurable diagnostic and therapeutic activities, lump sum for coordination and interdisciplinary activities, infrastructure and equipment. This option leaves the flexibility needed until more evidence is available for identifying an effective and efficient rehabilitation programme adapted to patients' rehabilitation needs and goals.
- FFS for measurable diagnostic and therapeutic activities; fee per discharge for coordination and interdisciplinary activities and a lump sum for infrastructure and equipment. The fee per discharge creates a financial incentive to admit new patients. This mechanism supposes an accountability obligation and quality control.

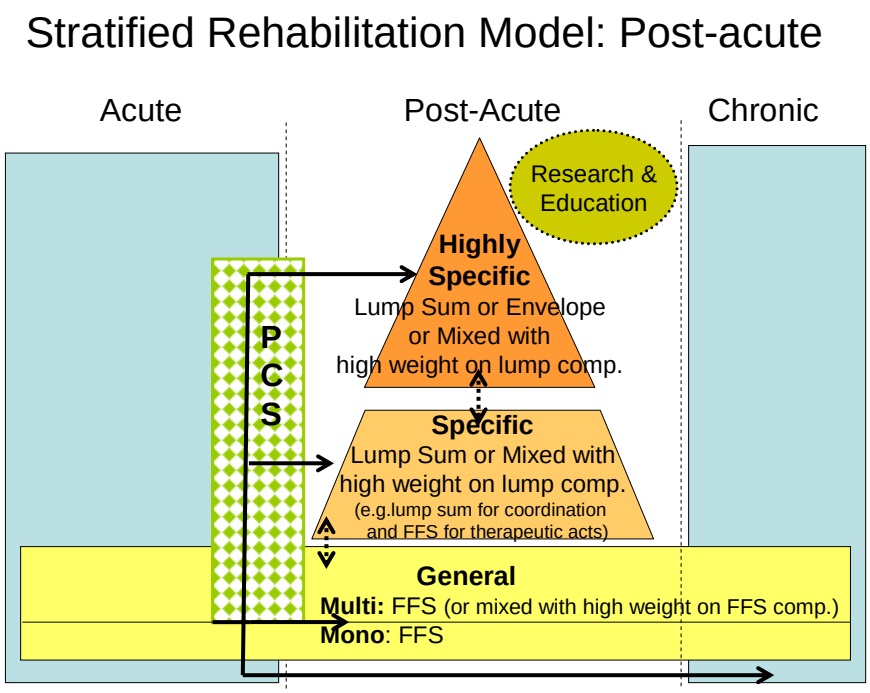
If the budget spent by the RIZIV/INAMI is supposed to cover all costs of rehabilitation, the budget needed is about €84 million for the specific rehabilitation services and €12 million for the highly specific services. In a budget neutral scenario, where the fixed budget is supposed to be equal to the budget spent in 2004 (€82 625 881), the budget needed is €48 million for the specific services and €7 million for the highly specific services. This is under the assumption that the levels as defined in this model are limited to the pathologies mentioned in each level and no other pathologies would resort in these levels. If the levels are expanded with other pathologies, the budgets –both the cost-covering and budget-neutral budgets- will increase. Figure 11.3 presents the budgets per pathology and per level for the different levels of the stratified rehabilitation model. For the total budgets per level, the 95% confidence interval limits are also presented. Especially for the general level, this interval is large.

Figure 11.3: Budgets for the stratified rehabilitation model

	Cost covering budgets	Budget neutral budgets*
Level 1: highly specialized services		
MS hospitalization	4 339 835	2.468.540
SCI (para) hospitalization	2 732 105	1.554.048
SCI (para) ambulatory	472 858	268.966
SCI (tetra) hospitalization	4 231 339	2.406.827
SCI (tetra) ambulatory	639 355	363.672
Total cost level 1 hospitalization	***11 303 278***	**6.429.416**
Total cost level 1 ambulatory	***1 112 213***	**632.638**
Total cost level 1	***12 415 491 (M€12.10 – M€12.67)***	**7.062.053 *(M€5.15 – M€8.60)***
Level 2: specialized services		
LEA below knee, hospitalization	847 434	482.029
LEA above knee, hospitalization	2 548 053	1.449.358
LEA above knee, ambulatory	914 422	520.132
MS ambulatory	13 365 918	7.602.666
Stroke hospitalization	36 750 132	20.903.836
Stroke ambulatory	29 302 206	16.667.382
Total cost level 2, hospitalization	***40 145 620***	***22.835.223***
Total cost level 2, ambulatory	***43 582 546***	***24.790.180***
Total cost level 2	***83.728.165 (M€71.16 – M€93.88)***	***47.625.403 (M€36 – M€53.89)***
Level 3: general rehabilitation services	***49.117.340 (M€31.85 – M€98.81)***	***27.938.425 (M€21.04 – M€41.39)***

* obtained by multiplying the share of the costs of the rehabilitation protocol for the pathology in the total extrapollated costs for the entire rehabilitation sector (€145 million) to the budget of 2004.

Figure 11.4: Financing mechanisms



Note: the dimension "hospitalized and ambulatory" is not visualized

11.2.3 Options for financing variants of the post-acute stratified rehabilitation model

Four variants of the post-acute stratified rehabilitation model were suggested in the previous chapter. The pathology-specific variant focuses on target populations or pathology groups.

11.2.3.1 Pathology specific variant

Since the basic level of this variant (general rehabilitation services) is similar to the general level of the stratified model (i.e. relatively low predictability of rehabilitation activities due to an expected high case-mix variability) the suggested financing mechanism is also similar: FFS or a mixed system with a relatively high weight of the FFS component. The second level (pathology specific rehabilitation centres) is characterised by centres treating relatively homogeneous patient groups. Therefore a lump sum or a mixed system with a relatively high weight of the lump sum component can be defended.

Figure 11.5: Budgets needed for all pathologies in a pathology-specific stratified organisation model (variant 1)

	Budget that covers all costs of the centres (€)	Budget that presumes budget-neutrality compared to 2004 (€)
THR		
Hospitalization	1 628 401	926 251
Ambulatory	0	0
Total	**1 628 401**	**926 251**
LEA		
Hospitalization	3 395 487	1 931 387
Ambulatory	914 422	520 132
Total	**4 309 909**	**2 451 519**
SCI		
Hospitalization	6 963 444	3 960 875
Ambulatory	1 112 213	632 638
Total	**8 075 656**	**4 593 513**
MS		
Hospitalization	4 339 835	2 468 540
Ambulatory	13 365 918	7 602 666
Total	**17 705 753**	**10 071 206**
CVA		
Hospitalization	36 750 132	20 903 836
Ambulatory	29 302 206	16 667 382
Total	**66 052 338**	***37 571 218***
Budget left for general services		***27.012.174,63***

presents the required budgets for financing all specific pathology reference centres (variant 1) for the 5 pathologies we examined for the entire Belgian population. One difficulty in this model is that it is unknown whether the 5 selected pathologies represent all pathology-specific centres that should be foreseen. If not, the budget allocated to general services will decrease and be allocated to additional pathology-specific centres.

Figure 11.5: Budgets needed for all pathologies in a pathology-specific stratified organisation model (variant 1)

	Budget that covers all costs of the centres (€)	**Budget that presumes budget-neutrality compared to 2004 (€)**
THR		
Hospitalization	1 628 401	926 251
Ambulatory	0	0
Total	**1 628 401**	**926 251**
LEA		
Hospitalization	3 395 487	1 931 387
Ambulatory	914 422	520 132
Total	**4 309 909**	**2 451 519**
SCI		
Hospitalization	6 963 444	3 960 875
Ambulatory	1 112 213	632 638
Total	**8 075 656**	**4 593 513**
MS		
Hospitalization	4 339 835	2 468 540
Ambulatory	13 365 918	7 602 666
Total	**17 705 753**	**10 071 206**
CVA		
Hospitalization	36 750 132	20 903 836
Ambulatory	29 302 206	16 667 382
Total	**66 052 338**	***37 571 218***
Budget left for general services		***27.012.174,63***

11.2.3.2 Function specific variant

Variant 2 of the organisational models differentiates reference centres based on "functional" impairment. Regarding a possible financing mechanism for this variant, the characteristics of both levels are similar to those of the previous variant. Consequently the suggested mechanisms are identical: FFS or a mixed system with a relatively high weight of the FFS component for the general rehabilitation services and a lump sum or a mixed system with a relatively high weight of the lump sum component for the reference centres.

Since in Belgium no information is available on rehabilitation patients at the functional level, and since for the 5 selected pathologies the subdivision according to functional impairment is not known, budget allocation cannot be specified.

11.2.3.3 Pathology specific trajectory based rehabilitation model

The 3rd variant presented in chapter 9, is the trajectory based model in which centres treat certain pathologies during the whole trajectory of care, namely acute, post-acute and chronic phase. Since the "general rehabilitation services" level of this variant has characteristics similar to those of the general level of the stratified model, the suggested financing mechanism for this level (with high case-mix variability) is FFS of a mixed system with a relatively high weight of the FFS component. The pathology specific rehabilitation centres will treat relatively homogeneous groups of patients, therefore a lump sum or a mixed system with a relatively high weight of the lump sum component is suggested.

The protocol proposed for the 5 pathologies was limited to the post-acute phase, and did not include the acute and chronic phase. Budget allocation for the subacute phase equals variant 1.

11.2.3.4 Goal oriented model

The goal-oriented model (variant 4) is based on the final goal the patient should attain: back to work or not. Depending on the homogeneity of patient groups the payment mechanism could be rather lump sum (in case of relatively homogenous patient groups) or rather fee for service (in case of relatively heterogeneous patient groups) oriented.

The proportion of patients in the 5 pathologies for which this goal possibly can be reached is unknown.

11.2.3.5 Managed care model

The last model (managed care model) emphasizes the role insurers can play in negotiating prices with providers. Insurance companies and sickness funds bargain with providers over volume, prices, quality and numerous other stipulations. Hence, the budget is determined by these negotiations.

Key points

- **Every payment mechanism has advantaged and disadvantages and may generate perverse incentives.**
- **FFS, lump sum and a mixed system were discussed.**
- **For the proposed organisational rehabilitation models, the general level is characterised by a relatively high case-mix variability. A reimbursement by a FFS or a mixed system with relatively high weight on the FFS component seems most appropriate for this level.**
- **For levels treating more homogeneous patient groups (specific or highly specific level, pathology specific level, function specific level, pathology specific centres) a mixed system with a relatively high weight on the lump sum or a fixed budget for the rehabilitation centre (envelope) seems appropriate.**

12 HOW CAN A REHABILITATION MODEL BE IMPLEMENTED IN BELGIUM: A REFLECTION

12.1 INTRODUCTION

People suffering from musculoskeletal and neurological impairments belong to a specific group requiring tailored care. Inspiration for an implementation approach for the rehabilitation model in Belgium can be found in the way Ontario (Canada) developed and implemented changes in post-acute rehabilitation care. Likewise, we will propose suggestions for a stepwise development and implementation of changes in the Belgian post-acute rehabilitation care.

12.2 THE EVALUATION AND SELECTION OF A CLASSIFICATION/ASSESSMENT TOOL FOR REHABILITATION CARE IN ONTARIO, CANADA

Ontario has been working on the development of an integrated funding model for rehabilitation. This work has been hindered by a lack of a general agreement on the patient classification system and assessment tool to be used for rehabilitation. A group of experts from different fields has been mandated to evaluate and recommend the implementation of a classification and assessment tool used for different purpose: inpatient and outpatient resource allocation, quality indicators, outcome measurement and care planning.

See Appendix to chapter 12.

12.3 STEPWISE DEVELOPMENT, VALIDATION AND IMPLEMENTATION OF CHANGES IN POST-ACUTE REHABILITATION MEDICINE IN BELGIUM.

Rehabilitation services have to manage the rehabilitation process in an efficient way. Patients should be referred to the right rehabilitation services whenever necessary and according to their rehabilitation needs and goals.

The transition through phases and different levels of service should be guaranteed by use of a patient classification system, implying continuity of care from acute over post-acute to chronic care.

Development, validation and implementation of changes in post-acute rehabiliation medicine in Belgium will next described in four steps (see Figure 12.1).

12.3.1 First step: Identification of a patient with rehabilitation needs and goals

The identification of a patient with rehabilitation needs and goals is necessary in order to initiate a rehabilitation trajectory. Moreover, from an organisational and financing point-of-view data are needed in advance about the number of patients needing a rehabilitation program. Therefore, the theoretical definition proposed in the first chapters of this study, has to be tested in the field to see whether practically all aspects necessary to organise rehabilitation in practice are included.

12.3.2 Second step: Selection of an appropriate functionality tool

As has already been extensively been discussed, a patient classification system implying a functional assessment is necessary in order to refer the patient within the stratified rehabilitation model.

A Steering Committee mandated by the Public Authorities should select one (or more) assessments tools, while a PCS, integrated in a outcome model is under development (see Chapter 3). The selected tools should be adapted to the Belgian context. Continuity from acute over post-acute to chronic care should be taken into account. The Committee could validate the tools in use in other countries in the Belgian context,

and define an appropriate set of data to collect in Belgium. In this validation exercise, existing Belgian registration systems like MVG-RIM2 can be taken into account (see chapter 4). Also, a cross-validation with ICF core-sets can be an option (see chapter 3). Next, a pilot registration system could be implemented, testing the feasibility of the proposed data set in the Belgian rehabilitation context.

12.3.3 Third step: Introduction/Development of a patient classification system and eventually a financing system

Until now, the link between the assessment tools and the financing of rehabilitation has not been thoroughly examined. Studies on the integration of the rehabilitation tools in the financing system have been undertaken in some countries (Australia, United States, Germany, Switzerland and Canada), followed by the introduction of the developed system in the financial system of the country (see chapter 3).

As mentioned in Step 2 and in previous chapters of this study, an assessment tool will be important in order to determine the patient's rehabilitation needs and goals for organisational and financing purposes as well as to orient him/her to the adequate clinical rehabilitation services. As outlined in chapter 3, nowadays it is not possible to find a classification tool that covers organisation as well as clinical purposes (much work is going on to develop such a system based on ICF). For organisational and financing purposes, patients characterized by a similar clinical profile and a comparable level of needed resources have to be classified in homogeneous groups. A pilot study should be launched focused on the choice of the patient classification system for organisational and financing purposes (and probably another one for clinical purposes) (see chapter 3). The ongoing international studies should be kept in mind, and as soon as they are available, new international developments in this field (based on ICF) should be taken into account.

Also, a cost model has to be developed, taking into account the findings in chapter 10 and 11 of this study.

12.3.4 Fourth step: Results: Organization and financing of post-acute rehabilitation care.

The PCS and financing model that will be the result of the study can then be implemented. This has to go hand in hand with measures assuring quality control. Thorough registration is needed in order to dispose of the necessary data to further plan rehabilitation services.

Figure 12.1: Stepwise development and implementation of changes in post-acute rehabilitation medicine in Belgium.

Federal Institutions	Steps	Actions
KCE report : Organisation and Financing of Musculosketal and Neurological Rehabilitation in Belgium		Publication and communication of the results
Developing, validating and implementing changes in post-acute rehabilitation medicine under the auspices of the Ministry of Public		Announcement of Implementation of an evaluation tool and patient classification system for post-acute rehabilitation medicine. Selection of the Steering Committee Selection of the research team(s)
	Step 1. Identification of patients with rehabilitation needs and goals	**Test** of the "theoretical" rehabilitation definition in the rehabilitation sector Determination of the number of patients concerned by the theoretical definition
	Step 2. Selection of an appropriate functionality tool	Steering Committee : selection of possible assessment tools Steering Committee : **validation** of the selected tool in the Belgian context Steering Committee : proposition of a data set collection **Pilot registration system** to test the feasibility of the selected assessment tool and the data collection
	Step 3. Introduction/Development of a patient classification system and eventually a financing system	Selection of possible patient classification system **Validation** of the selected system in the Belgian context Proposition of a data set collection **Pilot registration system** to test the feasibility of the proposed patient classification system **Development** of a cost model **Simulations and financial propositions**
	Step 4. Results : Organisation and financing of post-acute rehabilitation medicine	Planification of the rehabilitation activities in Belgium Quality control and development of a registration system Fixation of a budget

13 CONCLUSIONS

13.1 SUMMARY OF FINDINGS AND KEY-POINTS

The aim of this project is to study the current RIZIV/INAMI conventions for "locomotor rehabilitation" and to propose models for the organization and financing of musculoskeletal and neurological rehabilitation in Belgium.

The methodology consists mainly of scientific literature search. However, where scientific data lack they are completed with grey literature, data obtained from RIZIV/INAMI, FOD/SPF and sickness funds, national and international expert opinion, and expert meetings and surveys.

Based on an extensive literature search, a conceptual definition of musculoskeletal and neurological rehabilitation is developed within the framework of ICF (with specifications on individual and outcome, services, professionals and organization). The conceptual definition in a next phase has to be made operational. This should be done by the use of a comprehensive outcome model that structures all relevant outcome measures, and of a patient classification system which could ideally be used for resource allocation as well as clinical decision making.

Five representative pathologies are selected for further study: THR, LEA, SCI, stroke and MS. As up to date there are no comprehensive epidemiological Belgian data available (due to a lack of systematic central registration of pathologies or delivered rehabilitation activities), epidemiological data for these pathologies are gathered following the above mentioned methodology. The following incidences are found: THR 160/100.000/year (of which 15% are considered to need multidisciplinary rehabilitation: 5% presenting with polypathology and 10% considered as fragile patients), LEA 12/100.000/year (about half receive a functional prosthesis), SCI 2/100.000/year, stroke 185/100.000/year (of which 15% need specialised rehabilitation services) and for MS an incidence of 4-6/100.000/year and a prevalence of 90/100.000/year (10% yearly need hospitalisation and 15% need continuous ambulatory treatment).

Current Belgian clinical practice is investigated by means of a limited survey and compared to clinical pathways developed in several countries for the five selected pathologies. A great variance in rehabilitation practice is shown by the survey of nine Belgian medical rehabilitation specialists. This variance can be rejected nor confirmed by the study of the clinical pathways, as very few concrete data on the intensity and duration of rehabilitation are available in the detected pathways.

A detailed description of the current organization and financing systems of musculoskeletal and neurological rehabilitaiton in Belgium shows that the organization and financing of musculoskeletal and neurological rehabilitation in Belgium lacks transparency and clinical coherence: several parallel payment systems exist but are mostly based on historical factors rather than on criteria related to patients' rehabilitation needs and goals.

One payment system is linked to hospital stay with specialised beds (Sp beds) for diagnosis and treatment of musculoskeletal (S2) and neurological disorders (S3). Other systems are linked to rehabilitation activities and concern mainly nomenclature (K, M and R) and rehabilitation agreements (also called conventions, general 9.50 and specific 7.71). These systems are mainly fee for service systems.

Several combinations and cumulations (parallel as well as sequentially) of the different payment systems are possible, inducing a very heterogeneous rehabilitation landscape in Belgium. The different payment systems overlap significantly. There are no clear criteria for patient referral to the different types of rehabilitation organizations and the only characteristic on the limitative lists is the medical diagnosis. There are no criteria justifying an inpatient treatment. Patients' rehabilitation needs and goals are not formally assessed. Sp-beds are financed on a 7/7 days basis, discouraging weekends home. Neither is there reimbursement for travel expenses for weekends home. Moreover,

reimbursement for travel expenses is only provided for wheelchair bound patients and only for ambulatory treatment.

A payment system for multidisciplinary follow up of patients with permanent functional impairments due to musculoskeletal or neurological disorders in the chronic phase, exists only for a very limited number of pathologies (such as neuromuscular disorders or cerebral palsy).

The different rehabilitation organizations and Sp-beds are geographically relatively well spread, even though some corrections seem necessary.

There is no systematic registration of data concerning the performed rehabilitation activities. There is no accreditation system and only very limited formal quality control.

There is nomenclature for mono-disciplinary physical therapy and speech therapy, but not for other disciplines such as occupational therapy or psychotherapy.

The RIZIV/INAMI expenditures for (multidisciplinary) musculoskeletal and neurological rehabilitation accounted for 0.38 % of the Healthcare budget in 2000 and 0.48 % in 2004. In absolute figures the expenditure for musculoskeletal and neurological rehabilitation grew about 50 % over a five year period, 2000-2004 (from €57.340.095 to €87.361.509). K-nomenclature and convention 9.50 changed significantly in 2004 and 2006. It is too early to estimate the impact of these changes but there is a trend towards increased expenses for multidisciplinary K-nomenclature.

Price setting for each unit of payment, as well as per hour of therapy, depends on the system, is not transparent and mainly based on historical facts.

All financing mechanisms can be qualified as variable and prospective, generating similar incentives: increasing the number of units of reimbursement and decreasing the intensity of care (and the cost) within the unit of payment. In addition, an incentive for selecting good risks is produced.

An international study of five countries has been performed: The Netherlands, France, Germany, Sweden and the US. Most countries are struggling with the organization of this sector and are involved in the search for a clear rehabilitation concept comprising patients' needs, organizations for the different phases in the trajectory (acute, post-acute and chronic) and continuity of care. Unfortunately, no country disposes of a ready-for-use model for post-acute rehabilitation. All countries define different levels of rehabilitation: basic, specialised and highly specialised. For example, SCI rehabilitation is nearly always assigned to the most specialised level of care, because of the very specific needs and low incidence.

Several options for organizational models in the post-acute rehabilitation phase are proposed but the *'stratified rehabiliation model'* is recommended. This model contains three levels: general rehabilitation services, specific and highly specific rehabilitation services, organised in a network. The criteria used for patient assignment to the appropriate level are: complexity of rehabilitation needs and goals, and incidence and prevalence of consequences of health conditions. The implementation of this model requires a systematic assessment of patients' rehabilitation needs in the acute phase of the disease trajectory, which has to be repeated periodically and can result in a transfer of an individual to another level within the network. For this assessment a PCS is needed, preferably based on the ICF framework. At this point such a PCS is not available yet and further (international) research is needed in order to develop such a tool. Awaiting this, several patient data and current assessment measures can be combined (e.g. medical diagnosis and comorbidities, age, contextual factors and functional scales such as FIM or Barthel Index). Also, it is mandatory to start as soon as possible with a central registration system for patient profiles and delivered rehabilitation activities in order to dispose of real data concerning the needs in Belgium.

As in many other countries, a closed-end budget with a prospective financing system is preferable if we aim at keeping control over the rehabilitation budget. In an international context, most financing models try to integrate different components of financing rehabilitation into a lump sum approach as far as possible. In case a PCS is

implemented, budgets are being allocated to homogeneous groups of patients included in a PCS, for each type of rehabilitation organization.

The options for financing of the stratified rehabilitation model are the following. A FFS system (or mixed with high weight on FFS component) is proposed for the general rehabilitation services. For the specific and highly specific services a lump sum or mixed system with high weight on the lump component is recommended. At the highly specific level even an envelope payment system can be considered.

In order to perform cost calculations, standard rehabilitation protocols are needed. Because of the limited evidence-based literature available on post-acute rehabilitation, seven experts were asked to propose a rehabilitation protocol for an average patient with one of the five selected pathologies. Expert opinion is also used to estimate Belgian incidence of rehabilitation needs per pathology when no other information was available. Data from three rehabilitation centres are used to estimate costs of these rehabilitation needs. Due to the limitations of this methodology, these estimates of costs and revenues should not be used for policy decisions. The merit of this methodology is that it reveals certain weaknesses in the current reimbursement mechanisms for rehabilitation.

Aggregate revenues for ambulatory rehabilitation in Belgium are higher than for hospital rehabilitation. This relationship is not found for the costs of ambulatory rehabilitation and hospital rehabilitation. This points towards an artefact in the estimates of the revenues caused by the rules of the current financing system. More specifically, the absence of a separate tariff for group sessions induces higher revenues than costs for group sessions.

For a given rehabilitation protocol for each of the five pathologies examined, theoretical costs are higher than revenues (except for ambulatory rehabilitation for MS in convention 7.71). Aggregate revenues for rehabilitation services in each of the reimbursement systems are insufficient to cover theoretical aggregate costs. This can be explained by methodological weaknesses of the study (overestimated costs or underestimated revenues) and/or to the fact that the current reimbursement system does not reflect the cost structure of rehabilitation services. The real difference between costs and revenues will moreover depend on the actual case-mix.

One illustration of this inadequate reflection of the cost structure in current reimbursement rules is the reimbursement of a maximum of 2 hours of treatment per day in K-nomenclature and convention 9.50. For some pathologies (especially during the initial phase of rehabilitation during hospitalization) more than 2 hours of treatment per day is needed according to the proposed protocols.

The limited number of sessions and the limited duration of sessions in the K-nomenclature is insufficient to cover the therapeutic needs of patients with very complex rehabilitation needs, such as spinal cord injury.

The budget spent for musculoskeletal and neurological rehabilitation in 2004 highly resembles the estimates for aggregate expenditures if all rehabilitation protocols would be followed and if all activities would be reimbursed through convention 9.50. On the one hand, this may mean that the optimal rehabilitation paths are currently followed on average, although there might also be discrepancies between pathologies that level each other out. On the other hand, this may mean that the protocols are based on current practices rather than on rehabilitation needs. Anyway, all these data have to be interpreted with great caution due to methodological difficulties as a consequence of the lack of real data for Belgium on the one hand and scientific data on good clinical practice in musculoskeletal and neurological rehabilitation.

Based on the epidemiological data and the standard rehabilitation protocols the number of needed services at each level is estimated. It is assumed that general rehabilitation can be provided by the departments of PM&R present in most acute hospitals. Maximum 20 to 30 specific rehabilitation services are needed and between 3 and 5 highly specific services. Of course, these different services can combine rehabilitation acitivities for different patient groups (e.g. stroke and LEA in specific services, SCI and TBI in highly specific services).

In order to implement the different recommendations made in this report, the following steps are proposed. First of all patients with rehabilitation needs and goals should be indentified based on the conceptual definition to test the conceptual definition in clinical practice. Systematic registration of the patients' profiles and delivered rehabilitation activities, in a central database, should be started as soon as possible in order to allow for correction of the estimations mentioned above, based on real data. Then, a classification system should be developed in order to assign an individual to the appropriate level of rehabilitation services with regard to his rehabilitation needs and goals at a certain point in the disease trajectory. The currently existing rehabilitation services should be reoriented to respectively general, specific and highly specific services. A network permitting collaboration between the services of the different levels at the level of clinical activities as well as concerning research and education should be installed. Patient referral can then be realised within this network using the PCS. Finally, the appropriate payment systems need to be developed for the different levels as described above. Quality control should be implemented.

13.2 COMPARISON WITH THE REPORT OF THE MINISTERIAL WORKING GROUP (PROF. HEILPORN): "NETWORK OF MUSCULOSKELETAL AND NEUROLOGICAL REHABILITATION"

13.2.1 Introduction

On demand of Minister R. Demotte a "working group" was composed of different stakeholders and experts within the whole rehabilitation sector, under the direction of Prof. A.Heilporn. A subgroup concerning musculoskeletal and neurological rehabilitation held 16 meetings between January 2005 and November 2006. The report was published in 2007. The activities of the Ministerial group took place in parallel with the KCE project 2005-18 HSR titled "Organisation and Financing of Musculoskeletal and Neurological Rehabilitation in Belgium".

The aim of the **Ministerial subgroup** was to elaborate a concrete proposal for the organisation of musculoskeletal and neurological rehabilitation in Belgium, based on the recommendations as formulated in the policy note of the Minister and the report of the audit performed by Mr. Verhaevert of the budgetary commission of the RIZIV/INAMI (June 2004).

The primary aim of the **KCE project** is to study the current RIZIV/INAMI conventions for 'locomotor rehabilitation'. As financing and payment is very much related to organizational issues, the secondary aim of the study was to assess the organization and financing of musculoskeletal and neurological rehabilitation.

13.2.2 Methodology

The methodology of the **KCE project** was described earlier in this report throughout the different chapters. Summarised, the different issues were primarily approached in a scientific way by means of a thorough search of the available scientific literature. In the different steps of this project, evidence found in scientific literature was maximally used. Where evidence lacked, other sources were used such as grey literature, national and international expert opinion, expert meetings and surveys. Also, an exercise in analysis of costs and expenditures and some financial simulations were performed.

The **Ministerial Subgroup** applied a completely different methodology. The developed ideas are mainly based on expert opinion and dialogue between the different stakeholders, members of the subgroup. For scientific data concerning for example epidemiology reference is made to the KCE project.

13.2.3 Included Pathologies

The Ministerial subgroup, divided the disorders needing musculoskeletal and neurological rehabilitation into six groups with exclusion of children and adolescents who are treated as a separate entity.

For the KCE study five representative pathologies were selected, accounting for about 75% of inpatient rehabilitation and roughly 60% of outpatient rehabilitation. These five pathologies belong to five different groups of the Ministerial subgroup report, so only one subgroup (rheumatological disorders) is not represented in the analyses of the KCE study.

Ministerial subgroup	KCE study
1. Amputations	LEA
2. Brain injury	Stroke
3. Spinal cord lesion and peripheral neurological disorders	SCI
4. Progressive neurological disorders	MS
5. Rheumatological disorders	
6. Orthopaedic disorders and multiple trauma	THR

In the report of the Ministerial subgroup factors related to rehabilitation needs at level of intensity and duration were taken into account in the description of the six different groups of pathologies. These factors are based on the number of functional systems involved (e.g. motor system alone or motor system and cognition) as well as the anatomical distribution of the functional impairments (e.g. number of limbs involved), referring to the ICF-domain "Body Structures and Functions". Taking these factors into account, a distinction was made between patients whose rehabilitation needs can be answered by activities financed through 'Nomenclature PM&R' and patients for whom this nomenclature is insufficient to provide the necessary activities, again, in terms of intensity or duration.

The KCE as well as the Ministerial subgroup referred to the necessity to take all ICF domains into account when defining rehabilitation needs of patients. However, a full classification system for patient referral based on ICF is still under development.

The KCE did a literature search to find information on how to divide patients in need of musculoskeletal or neurological rehabilitation into distinct subgroups in funtion of organisation and financing. Of the described patient classification systems already in use in other countries, FIM-FRG and AN-SNAP were found to be the best. One of the limitations of these two systems is that they are based on assessment tools only evaluating ADL-activities. If one should aim at implementing FIM-FRG or AN-SNAP, a data-set of Belgian patients is necessary, so that the system can be validated for use in the Belgian context.

13.2.4 Comparison of the results and recommendations of both reports

13.2.4.1 Organisational models

Even though the methodology in both projects was very different, the main recommendations are very comparable. Both authors propose:

- a model comprising three rehabilitation levels and functioning in a rehabilitation network structure
- with patient referral to the appropriate level by means of an **assessment tool**.

LEVELS OF REHABILITATION

Apart from primary care (mono-disciplinary treatment), three levels of rehabilitation are proposed by both authors:

Ministerial subgroup		KCE study
Basic rehabilitation in the departments of PM&R	⟷	General rehabilitation services[hhh]
Locoregional rehabilitation centres (LRC)	⟷	Specific rehabilitation services
Categorical rehabilitation centres (CRC)	⟷	Highly specific rehab. Services

However, the assignment of the pathologies to the appropriate level shows several differences between the two studies, summarised in the following table. It has to be mentioned of course that the Ministerial subgroup did not dispose of epidemiological data. The KCE proposals, which are limited to the five selected pathologies for the study (and not valid for the whole of the groups in the Ministerial subgroup report) are highlighted in *violet italic characters*.

It has to be noted that in the proposals of the Ministerial subgroup a significant overlap exists between the basic levels and the LRC (e.g. for stroke patients). Also, it is proposed that in hospitals providing LRC, Basic rehabilitation should also be provided. CRC should provide LRC services for their own region.

[hhh] Mono- or multidisciplinary treatment, delivered in an organisation where a multidisciplinary supply can be provided.

Tabel 13.1: Comparison between report of Ministerial workgroup and KCE-report: pathologies in each level of the rehabilitation model.

	General/Basic	Specific/LRC	Highly spec./CRC
Amputations	BK (nomencl.) AK ; bilat.; BK + contralat. limb; (75 instead of 60 sessions)	upper limb	
LEA	(without prosthesis; monodisciplinary)	Most LEA in need of prosthesis	Very complex needs (very small number)
Brain Injury	1 system involved; temporary needs; motor system and dicrete speech problems	1 system involved; temporary needs; motor system and dicrete speech problems - Complex strokes with several deficits (motor + e.g. aphasia, bladder problems, cognition,..)	TBI (in function of younger age, combined deficits, functional and socio-professional prognosis) Always advice of CRC for patients with behaviour problems treated in general level or LRC
Stroke	(temporary needs)	Permanent disability (15% of stroke-incidence)	Very complex needs (e.g. socio-professional rehabilitation) and younger age (small number)
SCI and periph. neurol. disorders	Only motor system involved; always first consult in CRC	>=2 limbs involved; paraplegia and tetraplegia if only motor system involved; always first consult in CRC	>=2 limbs involved + other system;
SCI		(AMB in 2nd level if geographically too far from third level to follow AMB in third level)	HOS and AMB
Progressive neurol.disorders	Maintenance treatment (AMB)	AMB in function of CRC program	Complex rehabilitation in particular clinical situations
MS		AMB	HOS and AMB
Rheumatological disorders	Most rheumatological patients	Educational and professional needs	Complex rheumatological cases
Orthopaedic disorders and multiple trauma	Simple bone or joint lesions	>=3 limbs involved; >=2 limbs + pelvis or trunk involved	Very complex situation with other systems involved than orthopaedic (burns, respiratory deficit, bladder problem, neurolog. involvement…)
THR	all THR (85% mono; 15% multi)		
Children & adolescents	Maintenance treatment	More specialised	Neurolocomotor specific and complex; HOS; research and education

ASSESSMENT TOOL

In order to function, an objective PCS is needed to refer the patient to the adequate service level in the network, at the right time. Both authors refer to ICF as the framework of choice for a PCS in the future. The KCE report contains an extensive overview of the outcome measures, models and PCS currently used in other countries in musculoskeletal and neurological rehabilitation. At this moment, no such system or corresponding assessment instrument is ready for combined use for clinical as well as managerial objectives. Available PCS are mainly used for organisational/financing purposes, and in all these PCS, registration of the necessary data occurs at least at the beginning and at the end of the rehabilitation period. The KCE team proposes to start introducing one of the assessment instruments currently in use abroad within existing PCS for organisational/financing objectives: FIM or Barthel Index. At the same time, medical diagnosis, comorbidities, age and contextual factors (e.g. social situation) should be registered (e.g. at the beginning and at the end of the rehabilitation). The results of this data collection can already be used to refine the epidemiological data proposed in their study (and used to estimate number of services needed in Belgium). Next, a pilot study can be set up to validate the first results of this registration against data of RIM2 and ICF-core sets; or to validate a PCS currently already in use other countries.

The Ministerial subgroup proposes an application form combined with FIM as an evaluation instrument ("rehabilitation needs evaluation"), to be performed at the start and then every three months during the rehabilitation trajectory.

AMBULATORY TREATMENT VERSUS HOSPITALISATION

In the KCE report there are some limited data on inpatient versus outpatient therapy but no scientific rules to make the distinction were found on this topic in literature.

The Ministerial subgroup separately treats the importance of ambulatory rehabilitation in the different phases of rehabilitation, as far as the personal and environmental factors of the patient permit discharge home. It is stated in the report that ambulatory rehabilitation encourages patients' independence and quality of life and decreases hospitalisation cost. However, this implies sufficient nursing care in this setting, the organisation and financing of transport and cooperation with the general practitioner and primary care services. The Ministerial subgroup report underlines the importance of continuity of care and immediacy of the necessary services through the network. Concerning hospitalisation, the Ministerial subgroup proposes a new type of beds for hospitalisation in LRC and CRC: SpR-beds.

Also, in this report criteria for qualifications of the medical staff are defined for the different levels.

13.2.4.2 Financial models

For each rehabilitation level in the network, recommendations are made for an appropriate payment system. However, there are some significant differences in the recommendations between both reports.

In the Ministerial subgroup the recommendations concerning organisation and financing are based on the actual payment systems (Nomenclature PM&R and Conventions) whereas the KCE research team discusses several theoretical options.

The proposed payment systems are shown in the next table.

	Ministerial subgroup	KCE study
General/Basic	existing K-nomenclature (K30/K60, with for some pathologies a change in maximum number of sessions from 60 to 75)	fee for service (FFS) or mixed with high weight on FFS component
Specific/LRC	a new R-nomenclature (R1 for 2 hours and R2 for 3 hours of treatment)	lump sum or mixed with high weight on lump component
Highly spec./CRC	lump sum per day of treatment	envelope or lump sum or mixed with high weight on lump component

The KCE study comprises a detailed analysis of the current organisation and financing of musculoskeletal and neurological rehabilitation with budgetary data in the period 2000-2004, as well as a cost and expenditures calculation based on the estimated needs in the post-acute rehabilitation phase taking into account the developed stratified rehabilitation model, the epidemiological data on the five studied pathologies, and the 'standard rehabilitation protocols' developed for these pathologies by an expert group.

13.2.4.3 Number of services needed in Belgium

In the KCE study an attempt was made, based on literature data, to estimate the number of needed rehabilitation services at the different levels, for the five studied pathologies. These data were also used for the calculation of the estimated expenditures in the proposed financial model.

Both reports propose to supply basic/general rehabilitation in the departments of PM&R, present in most of the acute hospitals.

The number of rehabilitation services of the second level is estimated in by the KCE team as (maximal) 20 to 30 and in the Ministerial subgroup report 23 for stroke, or about 30 for the whole of the musculoskeletal and neurological rehabilitation. This is very similar, although there are some differences between the 2 studies in the subgroups of patients assigned to this level. However, centres can be larger or smaller and should be geographically well spread.

The report of Prof. dr. Heilporn mentions no estimations for the number of needed CRC and prefers to wait for the results of the KCE study. In the KCE report 3 to 5 highly specific centres are recommended, combining different pathology groups.

13.2.4.4 Quality and control

Both reports stress the importance of quality control.

The KCE report contains information on how quality control and accreditation is dealt with in the five studied countries, and proposes to restart evaluations of the rehabilitation organisations by a visitation committee.

The Ministerial subgroup proposes a yearly activity report for the locoregional and categorical rehabilitation services, as well as a yearly inspection of these LRC and CRC. For basic services (PM&R) no control system is proposed, whereas a lot of patients are assigned to this level.

The Ministerial subgroup also defines concrete (minimum) criteria for the LRC and CRC, based on the current situation and on expert opinion.

The KCE report provides epidemiological information which can in a second phase support the criteria as defined by the Ministerial subgroup.

13.2.4.5 Implementation of the recommendations

The KCE report proposes a four steps scenario for implementation of the recommendations, the Ministerial subgroup asks for transitional measures during a period of maximum six months.

13.2.5 Conclusion

The reports of the Ministerial subgroup "Network of musculoskeletal and neurological rehabilitation" and the KCE project 2005-18 HSR titled "Organisation and Financing of Musculoskeletal and Neurological Rehabilitation in Belgium" have to be considered as complementary.

The applied methodology is very different. The Ministerial subgroup report is mainly based on the current Belgian situation and concrete proposals are based on the input of the different stakeholders, member of the group. In the KCE project the recommendations are based on an extensive search of scientific literature, of grey literature and where necessary completed with national and international expert opinion, expert meetings and surveys. The approach is more a conceptual one, that can serve as a basis for further implementation into practise.

Despite the differences between both projects certain common conclusions can be drawn.

A stratified rehabilitation model is proposed comprising three levels of rehabilitation services with increasing complexity of the rehabilitation needs. The services part of the different levels are organised in a network structure. The patient is assigned to the appropriate level in a particular phase of the rehabilitation trajectory by means of a patient classification system. The ideal framework for this assessment instrument is ICF. However, as no such tool is currently available it is by both authors recommended to start by using a combination of different tools, such as FIM.

The KCE report also comprises analyses of the current financing systems as well as the proposed systems in the new model. The report of the Ministerial subgroup offers concrete (minimum) criteria for rehabilitation services on the one hand and propositions for payment systems for the different pathology groups on the other hand. The KCE report discusses different options for payment systems at the three levels.

Taking into account both reports, the number of needed services seems to be 3 to 5 for the most specialised level and between 20 and 30 for the second level. For the basic/general services no number was defined as they can be provided in the acute hospitals in the current departments of PM&R.

Both studies recommend to (re-)introduce a yearly inspection of rehabilitation services.

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Wettelijk depot : D/2007/10.273/18

KCE reports

1. Effectiviteit en kosten-effectiviteit van behandelingen voor rookstop. D/2004/10.273/1.
2. Studie naar de mogelijke kosten van een eventuele wijziging van de rechtsregels inzake medische aansprakelijkheid (fase 1). D/2004/10.273/2.
3. Antibioticagebruik in ziekenhuizen bij acute pyelonefritis. D/2004/10.273/5.
4. Leukoreductie. Een mogelijke maatregel in het kader van een nationaal beleid voor bloedtransfusieveiligheid. D/2004/10.273/7.
5. Het preoperatief onderzoek. D/2004/10.273/9.
6. Validatie van het rapport van de Onderzoekscommissie over de onderfinanciering van de ziekenhuizen. D/2004/10.273/11.
7. Nationale richtlijn prenatale zorg. Een basis voor een klinisch pad voor de opvolging van zwangerschappen. D/2004/10.273/13.
8. Financieringssystemen van ziekenhuisgeneesmiddelen: een beschrijvende studie van een aantal Europese landen en Canada. D/2004/10.273/15.
9. Feedback: onderzoek naar de impact en barrières bij implementatie – Onderzoeksrapport: deel 1. D/2005/10.273/01.
10. De kost van tandprothesen. D/2005/10.273/03.
11. Borstkankerscreening. D/2005/10.273/05.
12. Studie naar een alternatieve financiering van bloed en labiele bloedderivaten in de ziekenhuizen. D/2005/10.273/07.
13. Endovasculaire behandeling van Carotisstenose. D/2005/10.273/09.
14. Variaties in de ziekenhuispraktijk bij acuut myocardinfarct in België. D/2005/10.273/11.
15. Evolutie van de uitgaven voor gezondheidszorg. D/2005/10.273/13.
16. Studie naar de mogelijke kosten van een eventuele wijziging van de rechtsregels inzake medische aansprakelijkheid. Fase II : ontwikkeling van een actuarieel model en eerste schattingen. D/2005/10.273/15.
17. Evaluatie van de referentiebedragen. D/2005/10.273/17.
18. Prospectief bepalen van de honoraria van ziekenhuisartsen op basis van klinische paden en guidelines: makkelijker gezegd dan gedaan.. D/2005/10.273/19.
19. Evaluatie van forfaitaire persoonlijk bijdrage op het gebruik van spoedgevallendienst. D/2005/10.273/21.
20. HTA Moleculaire Diagnostiek in België. D/2005/10.273/23, D/2005/10.273/25.
21. HTA Stomamateriaal in België. D/2005/10.273/27.
22. HTA Positronen Emissie Tomografie in België. D/2005/10.273/29.
23. HTA De electieve endovasculaire behandeling van het abdominale aorta aneurysma (AAA). D/2005/10.273/32.
24. Het gebruik van natriuretische peptides in de diagnostische aanpak van patiënten met vermoeden van hartfalen. D/2005/10.273/34.
25. Capsule endoscopie. D/2006/10.273/01.
26. Medico–legale aspecten van klinische praktijkrichtlijnen. D2006/10.273/05.
27. De kwaliteit en de organisatie van type 2 diabeteszorg. D2006/10.273/07.
28. Voorlopige richtlijnen voor farmaco-economisch onderzoek in België. D2006/10.273/10.
29. Nationale Richtlijnen College voor Oncologie: A. algemeen kader oncologisch kwaliteitshandboek B. wetenschappelijke basis voor klinische paden voor diagnose en behandeling colorectale kanker en testiskanker. D2006/10.273/12.
30. Inventaris van databanken gezondheidszorg. D2006/10.273/14.
31. Health Technology Assessment prostate-specific-antigen (PSA) voor prostaatkankerscreening. D2006/10.273/17.
32. Feedback : onderzoek naar de impact en barrières bij implementatie – Onderzoeksrapport : deel II. D/2006/10.273/19.
33. Effecten en kosten van de vaccinatie van Belgische kinderen met geconjugeerd pneumokokkenvaccin. D/2006/10.273/21.
34. Trastuzumab bij vroegtijdige stadia van borstkanker. D/2006/10.273/23.
35. Studie naar de mogelijke kosten van een eventuele wijziging van de rechtsregels inzake medische aansprakelijkheid (fase III)- precisering van de kostenraming. D/2006/10.273/26.
36. Farmacologische en chirurgische behandeling van obesitas. Residentiële zorg voor ernstig obese kinderen in België. D/2006/10.273/28.
37. HTA Magnetische Resonantie Beeldvorming. D/2006/10.273/32.

38. Baarmoederhalskankerscreening en testen op Human Papillomavirus (HPV). D/2006/10.273/35
39. Rapid assessment van nieuwe wervelzuil technologieën : totale discusprothese en vertebro/ballon kyfoplastie. D/2006/10.273/38.
40. Functioneel bilan van de patiënt als mogelijke basis voor nomenclatuur van kinesitherapie in België? D/2006/10.273/40.
41. Klinische kwaliteitsindicatoren. D/2006/10.273/43.
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43. Herziening bestaande praktijkrichtlijnen. D/2006/10.273/48.
44. Een procedure voor de beoordeling van nieuwe medische hulpmiddelen. D/2006/10.273/50.
45. HTA Colorectale Kankerscreening: wetenschappelijke stand van zaken en budgetimpact voor België. D/2006/10.273/53.
46. Health Technology Assessment. Polysomnografie en thuismonitoring van zuigelingen voor de preventie van wiegendood. D/2006/10.273/59.
47. Geneesmiddelengebruik in de belgische rusthuizen en rust- en verzorgingstehuizen. D/2006/10.273/61
48. Chronische lage rugpijn. D/2006/10.273/63.
49. Antivirale middelen bij seizoensgriep en grieppandemie. Literatuurstudie en ontwikkeling van praktijkrichtlijnen. D/2006/10.273/65.
50. Eigen betalingen in de Belgische gezondheidszorg. De impact van supplementen. D/2006/10.273/68.
51. Chronische zorgbehoeften bij personen met een niet- aangeboren hersenletsel (NAH) tussen 18 en 65 jaar. D/2007/10.273/01.
52. Rapid Assessment: Cardiovasculaire Primaire Preventie in de Belgische Huisartspraktijk. D/2007/10.273/03.
53. Financiering van verpleegkundige zorg in ziekenhuizen. D/2007/10 273/06
54. Kosten-effectiviteitsanalyse van rotavirus vaccinatie van zuigelingen in België D2007/10.273/09
55. Evidence-based inhoud van geschreven informatie vanuit de farmaceutische industrie aan huisartsen. D2007/10.273/12.
56. Orthopedisch Materiaal in België: Health Technology Assessment. D2007/10.273/14
57. Organisatie en Financiering van Musculoskeletale en Neurologische Revalidatie inBelgië D/2007/10.273/18